FREE 100 PAGE TUTORIAL BOOK

XCAD DESIGN

THE COMPLETE CU AMIGA GUIDE

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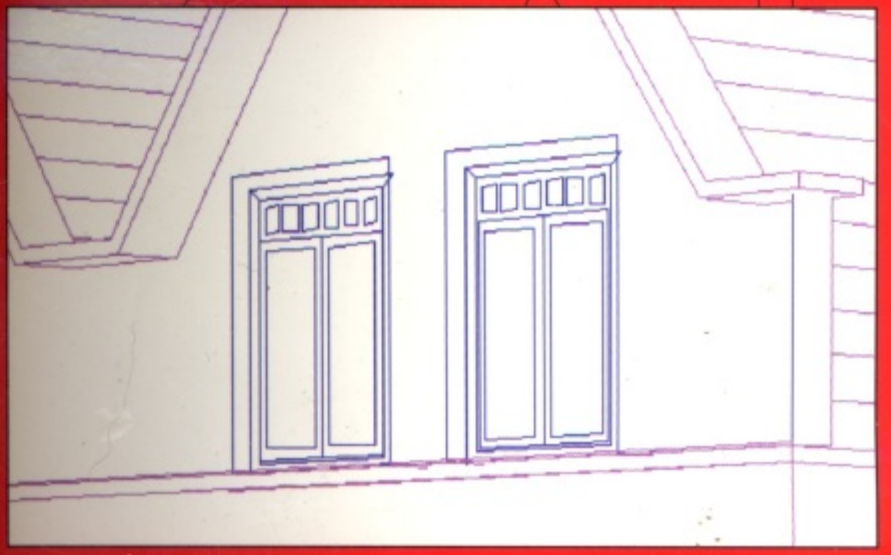
FREE 100 PAGE TUTORIAL BOOK

LEARN CAD THE EASY WAY

XCAD DESIGN

THE COMPLETE CU AMIGA GUIDE



XCAD DESIGNER

Now that you've got your hands on this month's brilliant coverdisk, you want to know how to use it. XCAD Designer will enable you to design just about anything you want. From a desk for your Amiga and monitor, to a house extension to put it in. Over the next 90 or so pages we'll be giving you an outline of XCAD Designer's main features. And believe me there are hundreds of them. We'll also be showing you how to design a relatively simple object to put into your house extension: a sink.

The XCAD range of Computer Aided Design packages are thoroughly designed to produce the highest quality results possible on your Amiga. XCAD originated on Unix systems, so that should give you an idea of its professional capabilities. But relax, despite its enormous capabilities, XCAD Designer is incredibly easy to use. We show you how ...

FIRST THINGS FIRST

The most important thing to do at this stage is to back-up your disk, if you are unsure of how to do this, please consult the Workbench manual which came with your Amiga. See also the disk loading pages inside CU AMIGA. OK, all backed up? Well read on ...

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endorsed manual for XCAD Designer and should not be viewed as such.

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INSTALLING XCAD

Using XCAD Designer from our coverdisk is very easy and straightforward. It will work from either a single floppy disk or can be installed on a hard drive.

FLOPPY DISK USERS

To use XCAD from floppy disk simply insert the XCAD Design cover disk - follow the instructions for loading and backing up your disk in this issue of **CU AMIGA** - and turn on your Amiga. Once the Workbench display comes up double click on the 'XCAD' icon a window will then appear showing two icons.

These icons allow you to run XCAD in either medium resolution, recommended if you are using a TV as your monitor, or high resolution, for multisync monitors that support higher resolutions.

HARD DRIVE USERS

If you own a hard drive you'll be pleased to know that XCAD Designer can be installed and run on it. To do this follow these simple steps:

1. Create drawers on your hard drive with the following names:

XSDATA	**XSMODS**
XSFONTS	**XSPOVLY**
XSLOVLY	**DRAWINGS**
MENUS	**SYMBOLS**

2. Now copy the contents of these drawers from the floppy disk to the newly created ones on your hard drive. You can do this by typing in the following at the shell, or alternatively use Directory Works from our recent coverdisk which will make this process a lot easier.

COPY DF0:XSDATA to HD0:XSDATA

You'll need to replace each directory name with each of those above as you proceed.

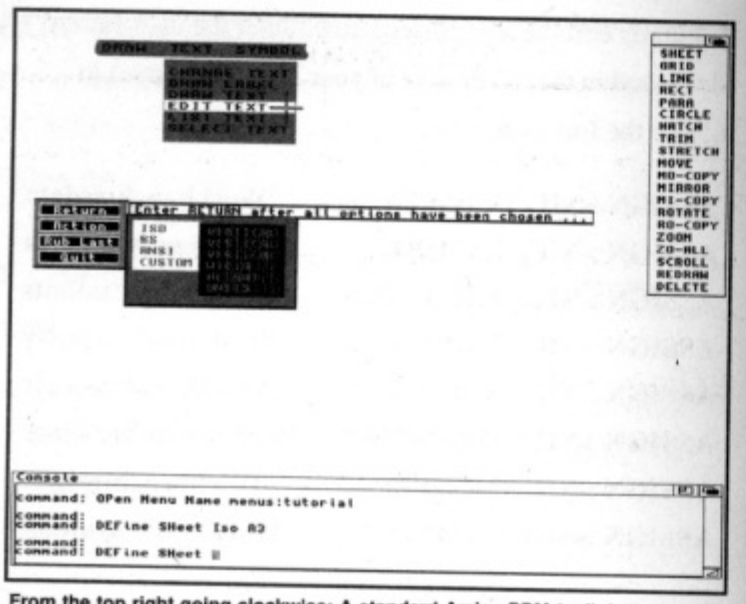
3. Now copy the program files over. In this case they can be dragged using the mouse as normal.

4. Finally edit the startup-sequence file or the user-startup file (found in the 'S' drawer of your boot hard drive) to include the following lines:-

```
ASSIGN >NIL: XSDATA:      Workbench:xsdata
ASSIGN >NIL: XSMODS:      Workbench:xsmods
ASSIGN >NIL: XSFONTS:     Workbench:xsfonts
ASSIGN >NIL: XSPOVLY:     Workbench:xspovly
ASSIGN >NIL: XSLOVLY:     Workbench:xslovly
ASSIGN >NIL: DRAWINGS:    Workbench:drawings
ASSIGN >NIL: MENUS:       Workbench:menus
ASSIGN >NIL: SYMBOLS:     Workbench:symbols
```

The startup files can be edited with any normal text editor. You'll need to change 'Workbench' in the above to your particular hard drive name.

And that's it. Now simply reboot your Amiga, load XCAD from the hard drive and follow the tutorials in the rest of this book – within a short time you'll be designing buildings that'll send Prince Charles into a frenzy of horror.



From the top right going clockwise: A standard Amiga PDM (pull down menu), the XCAD tool bar (also known as the menustrip), the console (used to type commands into) and an XCAD PUM (Pop Up Menu). These and your mouse are all you need to get the best from XCAD.

CONVENTIONS

There are several important conventions to learn before you start using XCAD some of these are standard across various other CAD packages but many are unique to XCAD. Let's begin.

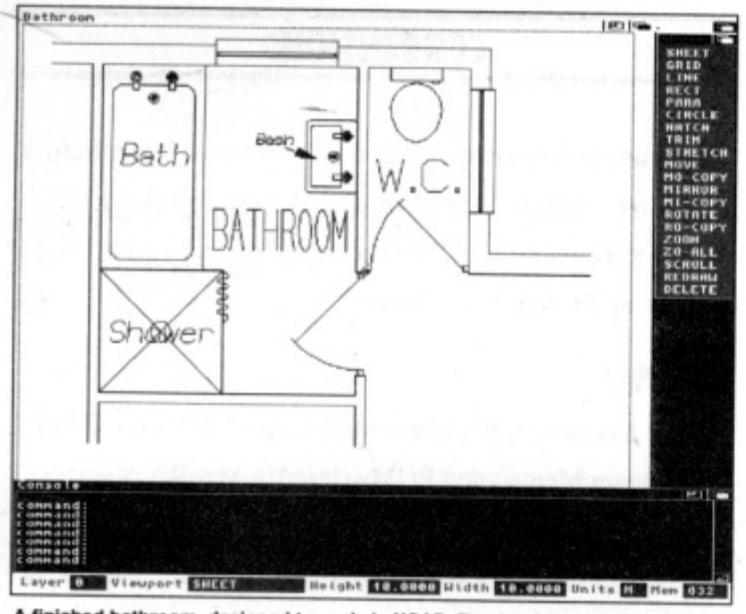
MENUS

XCAD has three types of menus: the tool bar menu, PDMs (Pull Down Menus) and PUMs (Pop Up Menus). See page 8 for examples of all three.

The tool bar menu is located to the right hand side of the screen, it cannot be switched off but can be 'hidden' as it works just like a normal Workbench window. Commands shown on the tool bar are accessed simply by clicking on them with the left mouse button.

PDMs are standard Amiga menus. They are accessed by holding down the right hand mouse button, moving the cursor over the desired menu option and then releasing the right mouse button.

PUMs are XCAD-specific menus. They are automatically accessed when you select a particular command from the tool bar, a PDM or by typing a command at the console (see page 10).



A finished bathroom, designed to scale in XCAD. Try drawing a plan like this yourself, it will improve your understanding of XCAD enormously.

COMMANDS

CONSOLE

There are two ways of entering commands into XCAD. The first is to use the mouse to click on commands in the various menus, the second to use the keyboard to type commands in the 'console' section of the screen. Typing commands is often quicker but until you have gained confidence in using XCAD it is recommended that you use the menus. Most commands can be abbreviated to one or two letters (in both this manual's index and XCAD itself the abbreviations are shown as capital letters and the remainder of the command is shown in lower case e.g. DRaw LIne).

PDM options are shown in the tutorial as bold text separated by an arrow (e.g. PDM: FILE → SAVE DRAWING), PUM and tool bar options are shown in square brackets (e.g. [LINE] [ACTION]).

ENTITIES

A line in XCAD is called an entity. Lines can also be grouped together to make a single entity, for instance a sentence of text in XCAD is a single entity even though it is made of several letters. Lines, arcs, circles, splines, dimensions and arrows are all examples of XCAD entities.

CLICKING

Clicking is the process of placing the crosshairs over an item and pressing the left mouse button briefly. When you click on an entity an 'x' will appear in the console if you have entered a command.

SYMBOLS

To save time when creating a drawing it is often useful to have 'libraries' of symbols made up. Symbols are XCAD's equivalent of brushes in a paint program. Essentially, a symbol is created by selecting several entities, for example all the lines which make up a complete item, and then saving it to disk. Once created, a symbol can be copied onto the screen at any position and angle, saving hours of work.

BACK SPACE

The back space key on the keyboard is used to cancel the last entry, be it a command, a point, a number or anything else.

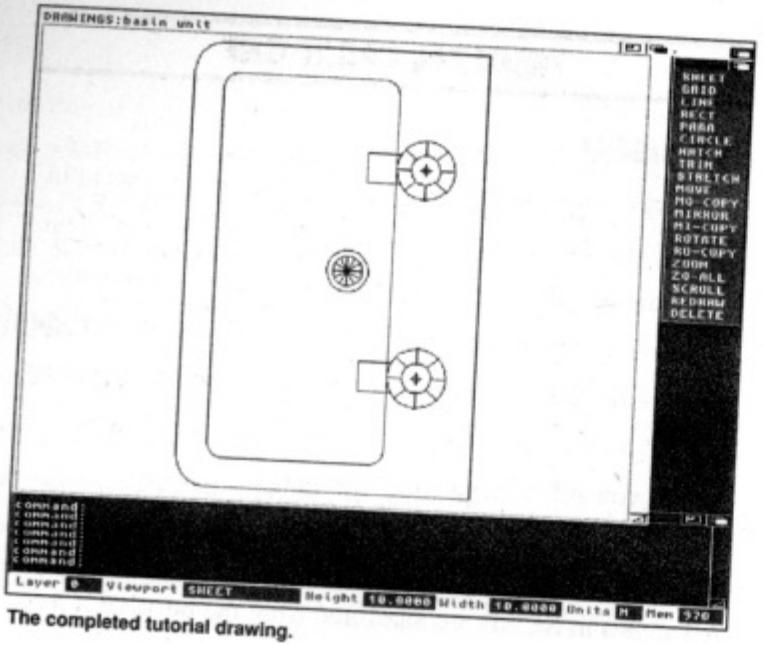
GENERAL CAD RULES

MOVEMENT

Horizontal movement in XCAD is known as movement in the 'X axis' and vertical movement as in the 'Y axis.' This is standard in all design programs and also in mathematics. Movement to the right is considered to be a 'positive movement in the X axis' whilst to the left is 'negative.' Similarly upward movement is 'positive movement in the Y axis' and downward is 'negative.'

ANGLES

All angles in XCAD are measured from the positive X axis i.e. the 'three o'clock' position. Angles move in an anti-clockwise fashion from the X axis i.e. forty five degrees points up and to the right. Again this is easiest to understand by looking at the diagrams on page 14.



The completed tutorial drawing.

TUTORIAL - PART ONE

PART 1

Although the tutorial in this manual may seem overly simple it has been carefully designed to introduce XCAD's commands in a simple step-by-step way. Whilst hardly the most exciting of projects, the tutorial should, with a little input of thought, provide all of the main concepts required to use XCAD's full range of tools. It is highly recommended that you follow the tutorial exactly, that way you will be most likely to understand the commands reference section of this manual.

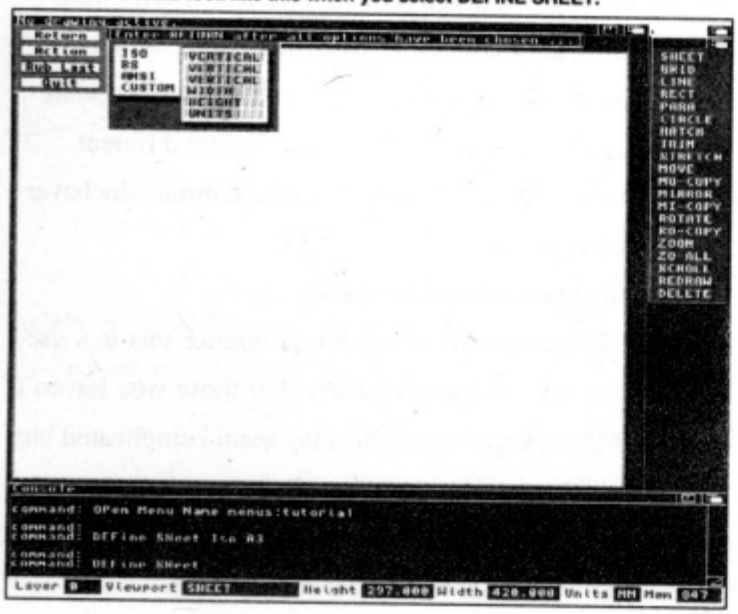
The pictures used in this tutorial were produced using XCAD in a high resolution screen mode (i.e. 640 x 512). If you are using your Amiga on a television or a non-multi-scan monitor you may find it easier to use a medium resolution instead. All of the commands will work in the same way, though the drawings will appear slightly different. You should still get full benefit from the tutorial whichever screen mode you use.

Object: to create a basin or a sink

If you're designing almost any house interior this is a useful object to save and use regularly. For those who haven't used a CAD package before this may seem complicated but should provide you, if you follow the instructions properly with a good grounding in using XCAD design. Those who are familiar with CAD will find it easy enough.

The standard opening screen in XCAD.

The screen should look like this when you select DEFINE SHEET.



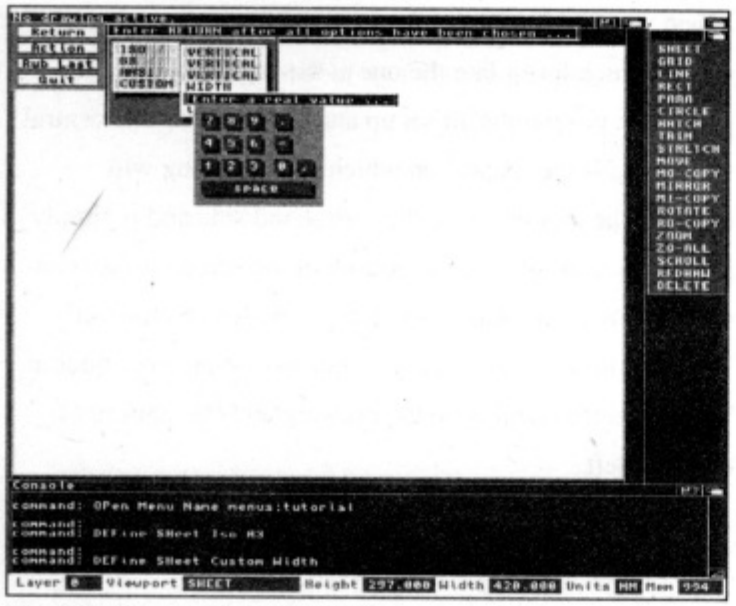
When you first load XCAD you should be presented with a screen which looks like the one at the top of the opposite page. The program is all set up and ready to go. The central white area is the 'paper' on which your drawing will appear. The tool bar is on the right-hand side and is simply a list of commands. At the bottom of the screen is the 'console' where commands appear and can also be typed in. The console also has a small 'status bar' at the very bottom which includes details on the drawing and the amount of memory left.

The first thing to do is to resize the 'paper' for the job in hand. For this example we are going to produce a small floor plan so it needs to be a reasonable size, in this case ten metres by ten metres. So go to:

PDM:VIEW and select DEfine SHeet

(i.e. hold down the right mouse button; move the crosshairs over **'VIEW'** in the top right of the screen; move the crosshairs down to the **'DEFINE SHEET'** option in the list; release the right mouse button.)

Your screen should now look like the one on the bottom of the opposite page. The box which has appeared in the top left of the screen is a PUM (Pop Up Menu).



This is XCAD's standard numerical PUM.

Now Select 'custom' from the PUM by moving the crosshairs over it and pressing the left mouse button.

[CUSTOM]

Now select width.

[WIDTH]

You should now see a PUM resembling a calculator, like the one at the top of the opposite page. This is the numerical input PUM, it is used throughout XCAD as a simple way of using the mouse to input numbers.

[1] [0] [SPACE]

The console at the bottom of the screen should now read:

DEfine SHeet Custom Width 10

If it doesn't then press the back-space key to delete the number and re-enter it. Then repeat the process for height:

[HEIGHT] [1] [0] [SPACE]

Selecting the units to be used.

The completed operation. A page 10 metres square.

Now select:

[Units]

Which brings up a new PUM (see top opposite). Select:

[METRES]

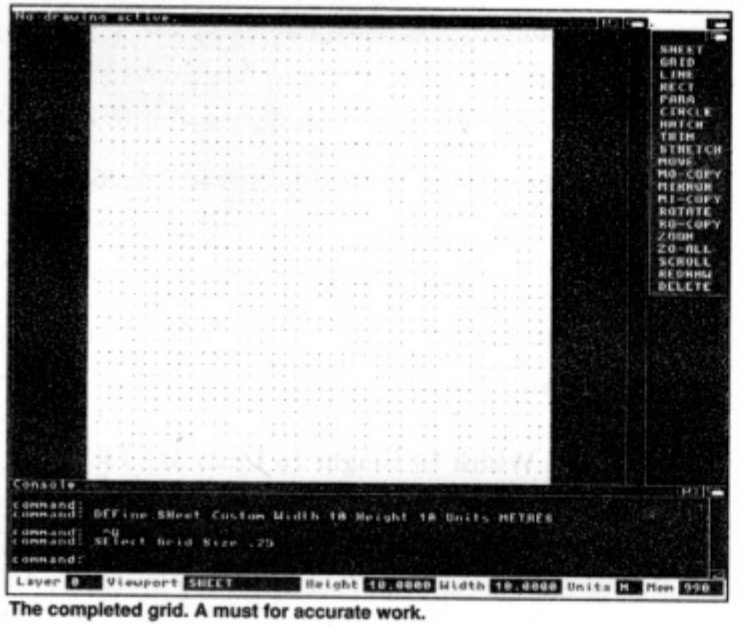
Which completes the specification of the page. The console should now read:

DEfine SHeet Width 10 Height 10 Units METRES

All that remains to do is to confirm it (if you have made a mistake you can use either the back-space key to change what you have done or [QUIT] to start again). If you're happy with it select:

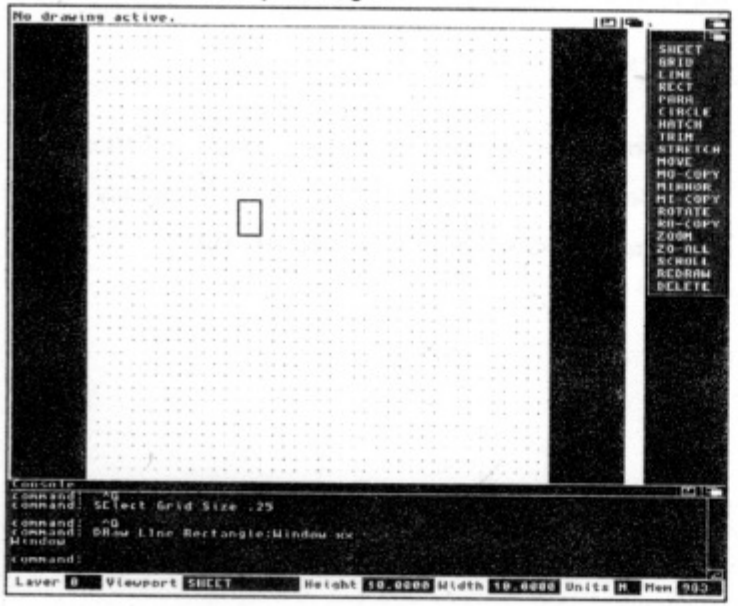
[RETURN]

You should now see a screen like the one at the bottom of the opposite page. Congratulations, you have already mastered the basic menu system used by XCAD.



The completed grid. A must for accurate work.

The first entity drawn, a simple rectangle.



To ensure that lines are placed accurately, XCAD uses a 'grid' which points 'snap' to. Essentially the grid is a series of dots on the screen at regular intervals. When you place a point on the screen XCAD automatically puts that point on the nearest dot; this is called 'snapping.' Initially we will use a grid with dots spaced at 0.25 metre intervals. Select 'grid' from the tool bar and select the following:

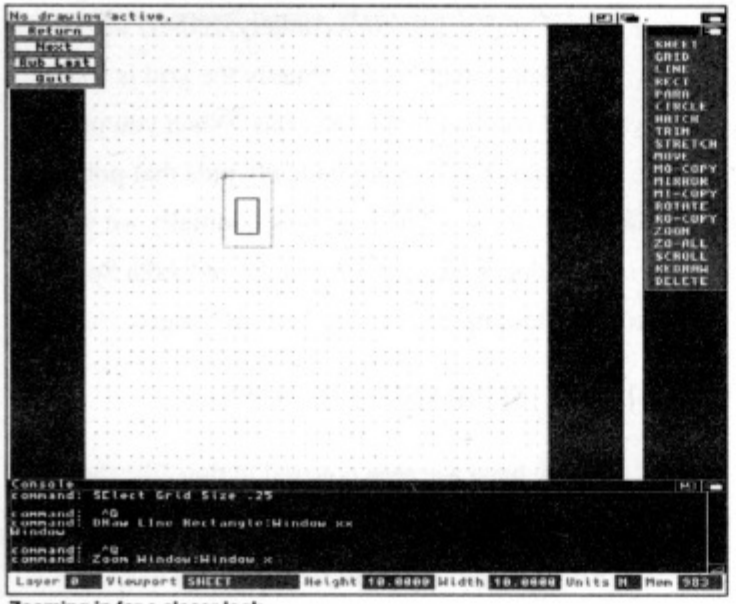
[GRID] [.] [2] [5] [SPACE] [RETURN]

You should now have a screen covered in dots like the one at the top of the opposite page. Now to create the outline of the basin, which should be 0.5 m by 0.75 m. Select 'rect' from the tool bar:

[RECT]

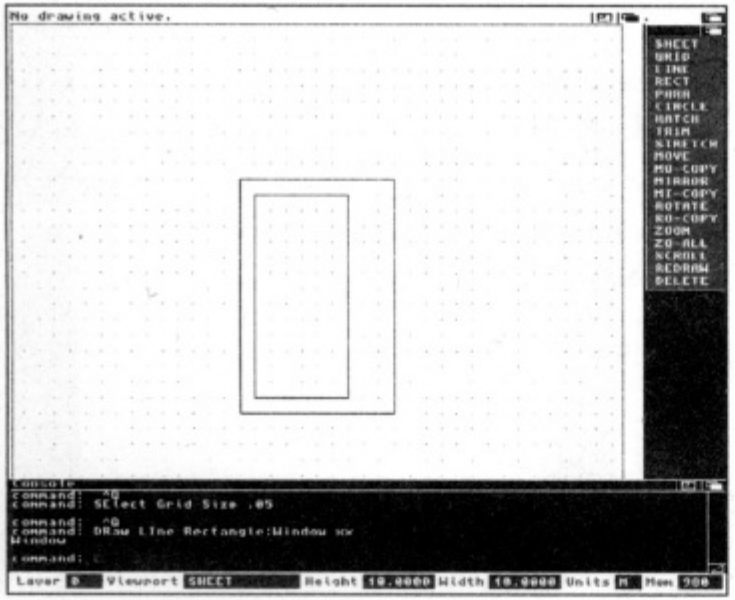
Move the cursor into the middle of the 'paper' and click once. Drag the mouse to produce a rectangle two dots wide and three dots high (like the one at the bottom of the opposite page) and then click again. You can use the back-space key to 'undo' any mistakes you make. Finally select:

[RETURN]



Zooming in for a closer look.

The bowl of the basin as it should be.



- Now let's get a little closer to the action. Select:

[ZOOM]

Having selected this, click on a point near your original rectangle and drag the resultant box out to make a 'zoom area' rectangle around the one you have already drawn (like the one at the top of the opposite page). Now that the picture is magnified (see bottom left), we need to make the grid more detailed so click on the following:

[GRID] [.] [0] [5] [SPACE] [RETURN]

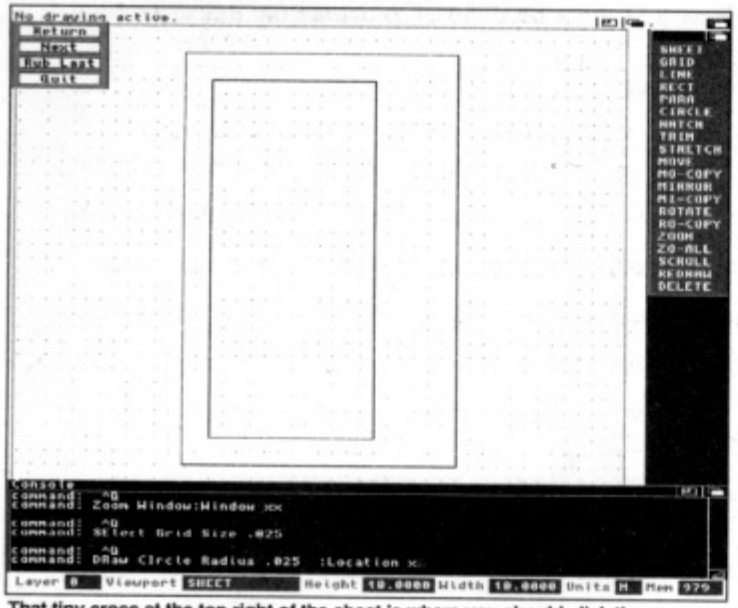
Now to draw the bowl of the basin select:

[RECT]

And click on the same dots as shown in the bottom picture on the opposite page to create the inner rectangle.

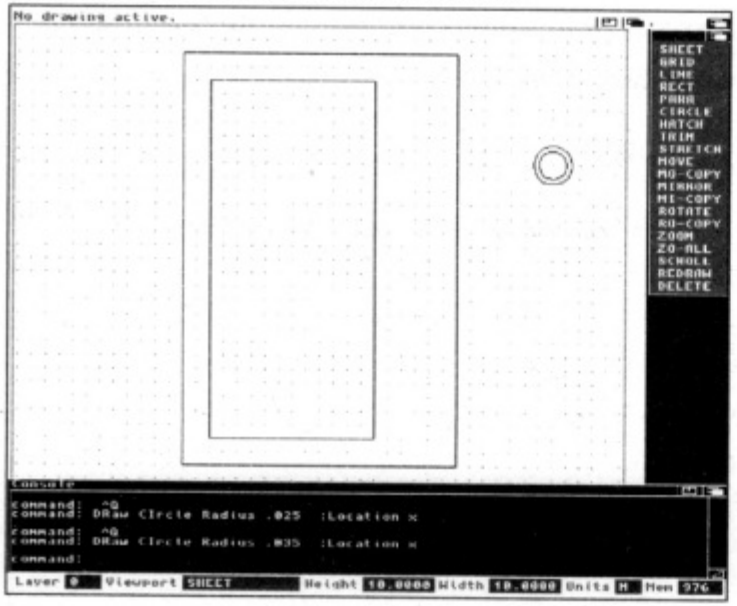
[RETURN]

Hardly a masterpiece so far, but it does get better.



That tiny cross at the top right of the sheet is where you should click the cursor, indicating where the circle should be placed. Finally it should look like ..

... this once both circles are drawn. Then zoom in and ...



Now to create something a little more complex; the plug hole. Click on the following:

[CIRCLE] [RADIUS] [.] [0] [2] [5] [SPACE] [ACTION]

Now position the centre of the circle by clicking somewhere well outside of the outline of the sink, as shown in the diagram at the top of the opposite page and select.

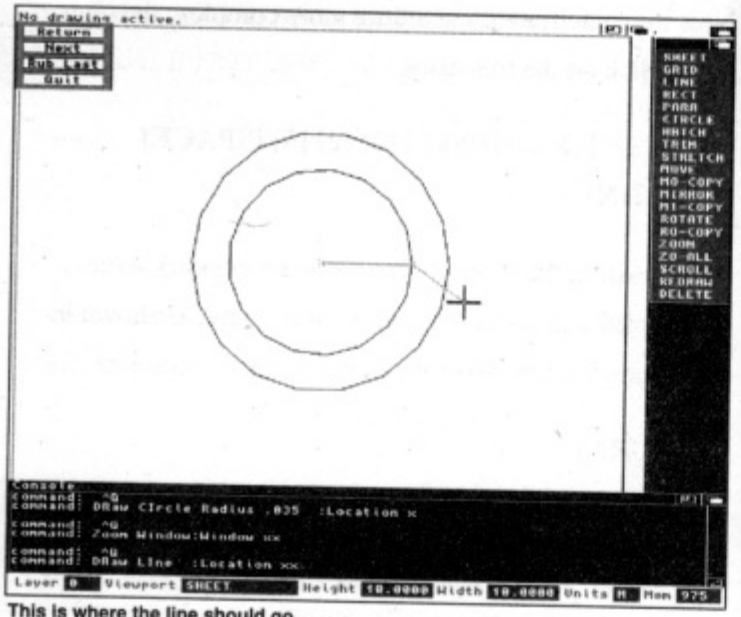
[RETURN]

Now create another, slightly larger circle in the same position. Again select the following in order (the small '**x**' is not a command instruction, it signifies a a point or object selected by clicking on the left mouse button in the desired area. In this case you must click with the mouse in the location prescribed in the top caption on the opposite page):

[CIRCLE] [RADIUS] [.] [0] [3] [5] [SPACE] [ACTION] x [RETURN]

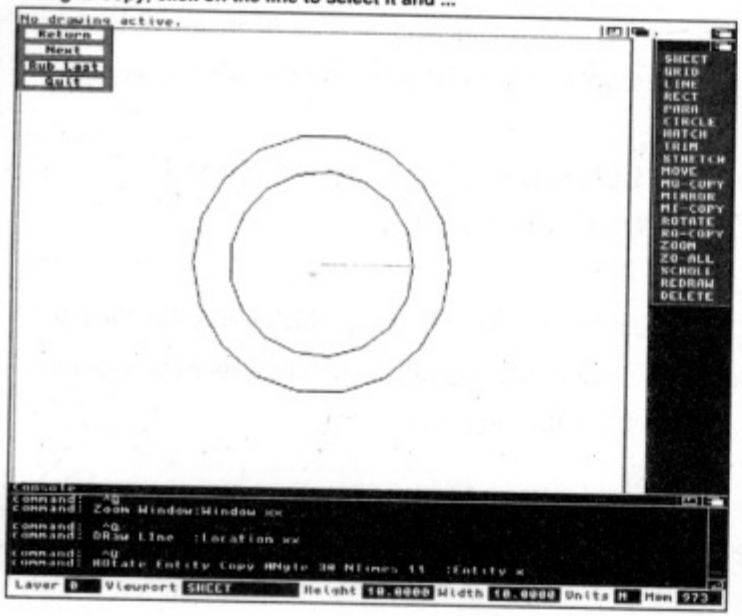
You should now have a drawing which looks like the one at the bottom of the opposite page. Let's zoom in to get a closer look at the plug hole:

[ZOOM] xx (these two clicks should be used to create a zoom box as described on page 27)



This is where the line should go.

Using ro-copy, click on the line to select it and ...



Now for something a little sneaky, you're going to use one of XCAD's neatest features. First though you'll need a line to work with, try entering:

[LINE] [ACTION] xx

To produce a line like the one in the picture at the top of the opposite page by clicking (**x**) once to select the centre point of the circle and then clicking (**x**) again on the circumference of the inner circle. Then select ...

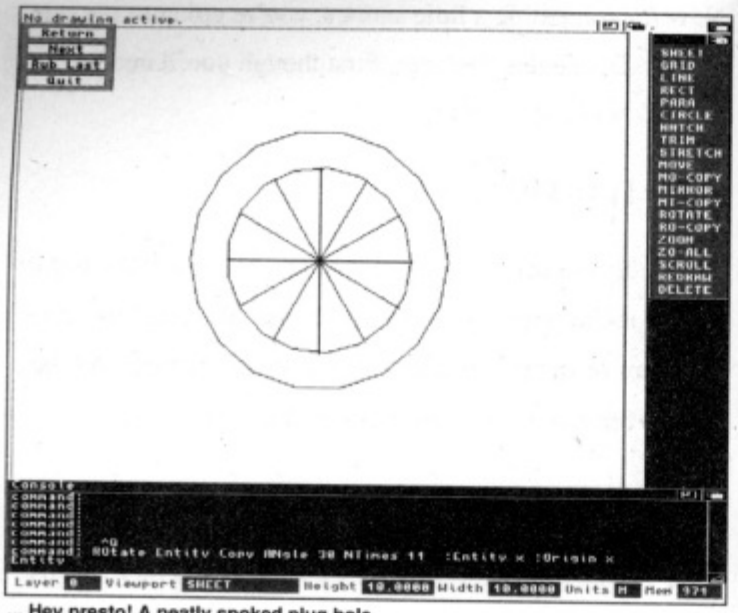
[RETURN]

Now for the fun bit, to save trying to draw another 11 lines around the circle it is time to:

[RO-COPY] [ANGLE] [3] [0] [SPACE] [NTIMES] [1] [1] [SPACE] [ACTION]

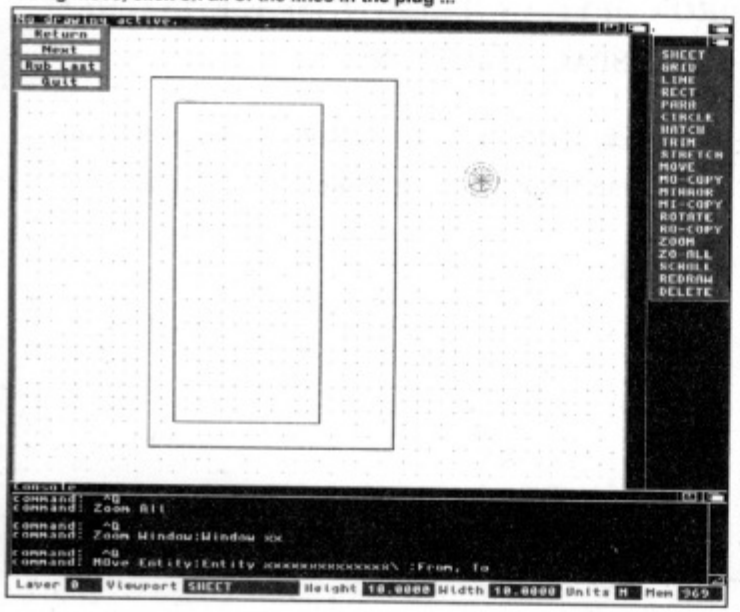
Then click on the line you have just created, as in the diagram at the bottom of the opposite page, then click on:

[NEXT]



... Hey presto! A neatly spoked plug hole.

Using move, click on all of the lines in the plug ...



And finally, the 'Ro-Copy' function needs to know which point to rotate the line around so click in the centre of the circle ...

x [RETURN]

... and hey presto, you should now have a diagram like the one at the top of the opposite page. Now to put the plug hole into the sink, first though you'll need to be able to see the sink, select:

[ZO-ALL]

then zoom in in the manner described previously so that you can see both so click on ...

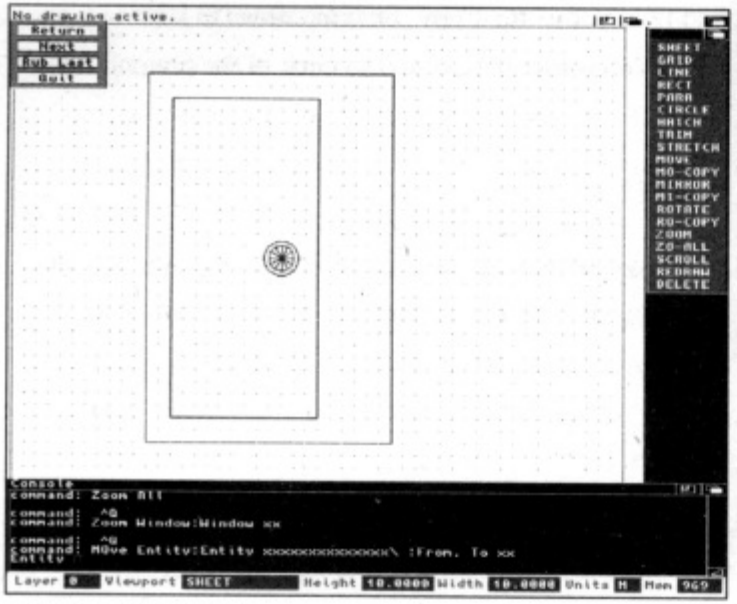
[ZOOM] xx

... and finally the move itself:

[MOVE]

You now need to select all of the lines which make up the plug hole, you should do this by clicking on all of the lines until they are highlighted like the picture at the bottom of the opposite page ie select:

xxxxxxxxxxxxx [NEXT]



... and move it into the basin.

Lastly the 'Move function' needs to know the start and end points of the move. Click on the centre of the plug hole, then click on a point 13 dots down and three dots in from the right-hand side of the bowl as in the picture opposite. You now have the beginnings of a really good basin. A few more modifications and some taps are needed but we'll do that in the next section. If you have plenty of time you could head straight on to it. Perhaps it would be wisest to save all of your work first though, so in the PDM menu select File and then 'save drawing' ie:

PDM: FILE → SAVE DRAWING

Then type a file name at the keyboard, it is probably sensible to call it 'basin' or something similarly obvious like 'tutorial' so that it is easy to remember, for example:

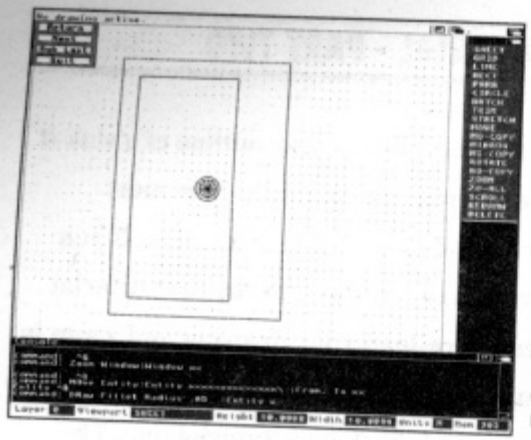
"basin" [RETURN]

TUTORIAL - PART TWO

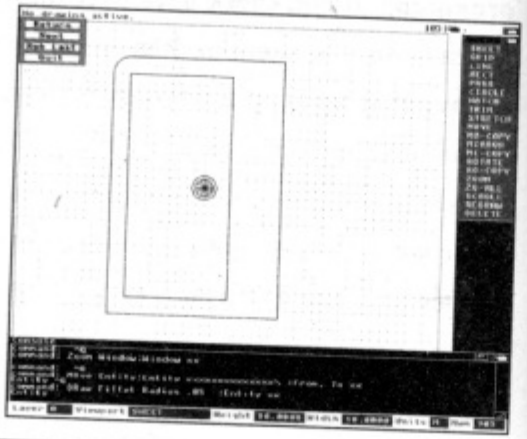
PART 2

Now that you have a basic outline of a sink it is time to spruce it up a little. The most important addition being some taps. If you have taken a break between this and the first tutorial then you will need to re-load your drawing and zoom in. By now you should be perfectly able to do this without prompting. If not, check back over tutorial one. The Zoom feature is essential. Remember, you have created an area that takes up ten square metres.

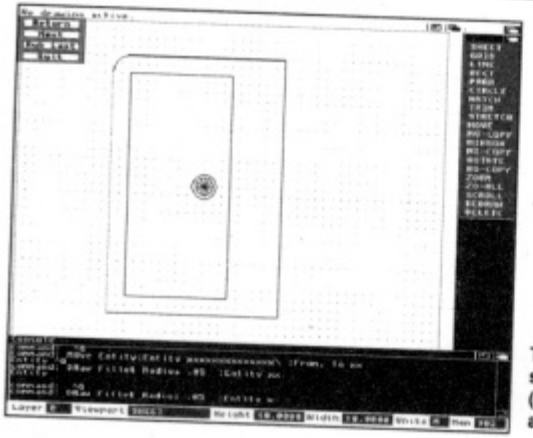
For this tutorial it is assumed that you have both completed and understood the previous section. Some major new concepts are introduced but if you have managed so far then you should find them easy enough.



The top line is selected first as we go anti-clockwise around the basin ...



... to create a perfectly rounded corner.



The left-hand line selected first (still going anti-clockwise) ...

The most obvious feature of the sink so far has to be that it is very angular. To rectify this we will 'fillet' the lines. Filleting rounds sharp corners.

IMPORTANT: Fillet only works properly in an anti-clockwise direction, so make sure you click on lines in the correct order. First click on:

[PDM: DRAW → DRAW SPACE FILLET] [.] [0] [5] [SPACE] [ACTION] x

Where '**x**' is the top line (as in the diagram at the top of the opposite page) then select:

x [RETURN]

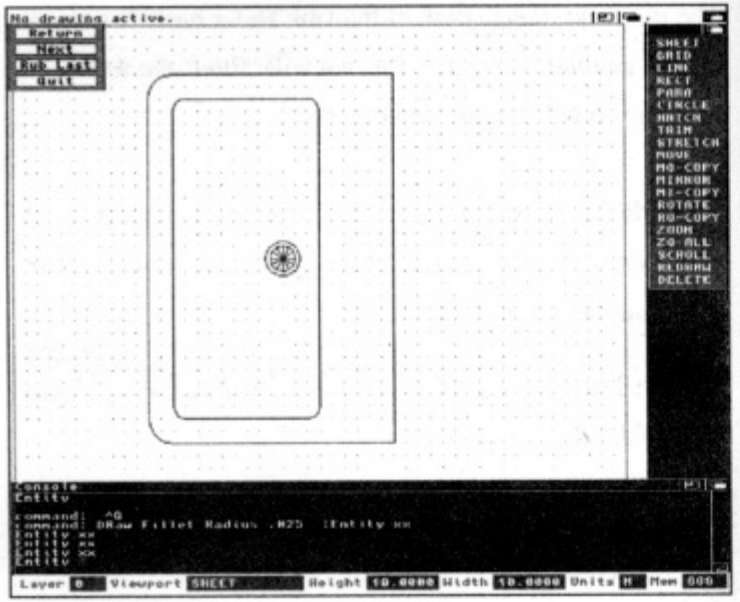
... this '**x**' is the line furthest to the left. You should now have a picture like the one in the centre of the opposite page. Repeat this process for the other main corner by selecting:

[PDM: DRAW → DRAW SPACE FILLET] [.] [0] [5] [SPACE] [ACTION]

Where the '**x**' is the furthermost line to the right as in the diagram at the bottom of the opposite page (because it is the first line if you go anti-clockwise). Then select: ...

x [RETURN]

thus completing the curves.



... makes the outline of the basin look just right.

Now to automate the process a little. This time it is the bowl which needs some curves. We will do the whole thing using just one fillet command, select

[PDM: DRAW → DRAW SPACE FILLET] [.] [0] [2] [5] [SPACE] [ACTION] xx

Where the two xs are the top line and the right line (note that we are travelling anti-clockwise around the bowl). click on :

xx

... the right line and the bottom line ...

xx

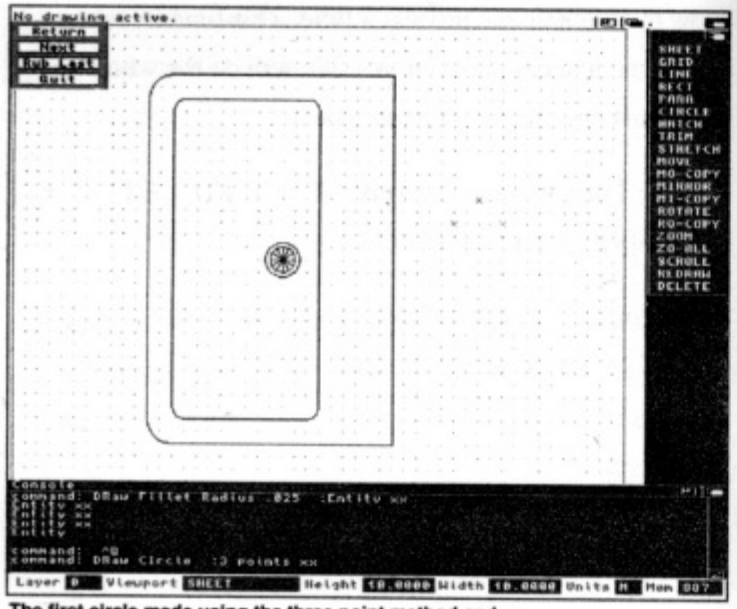
... the bottom line and the left line ...

xx

... the left line and the top line ...

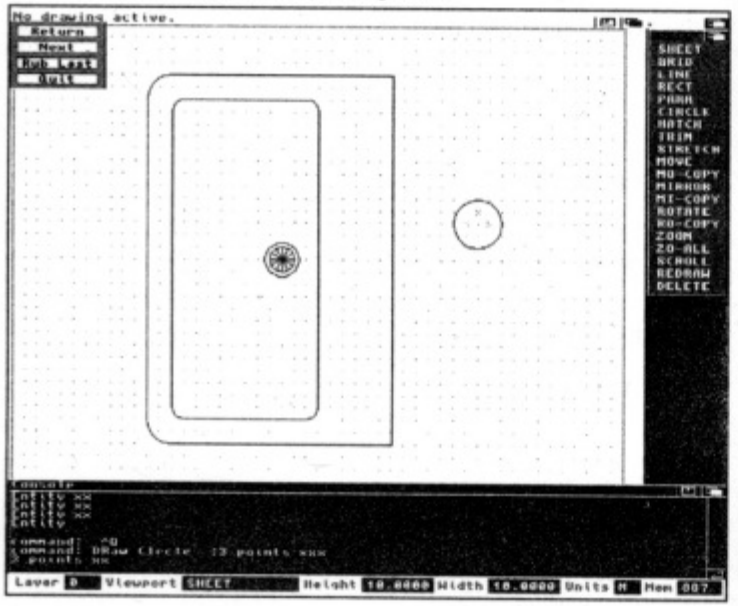
finally select [RETURN]

... and it is done. You should now have a nicely curved bowl to your basin.



The first circle made using the three point method and ...

... the second circle made before pressing return.



Now that you have a reasonable-looking basin it is time to add some taps. For these we will introduce the idea of symbols (like brushes in a paint program). First, though, we need to draw the taps, click on :

[CIRCLE] [ACTION] xxx

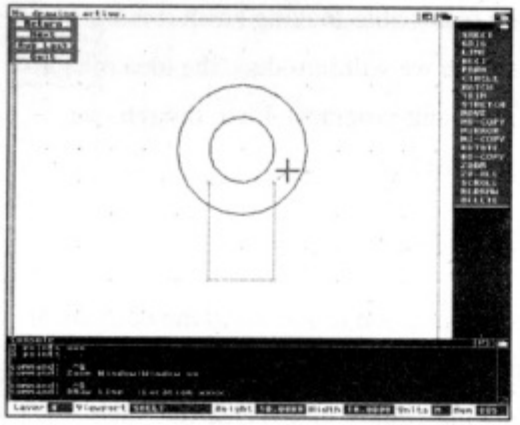
With '**xxx**' in the same position as shown in the diagram at the top of the opposite page. This is an alternative to the previous way of drawing circles, in this case the three points are all crossed by the circle. Now select:

xxx [RETURN]

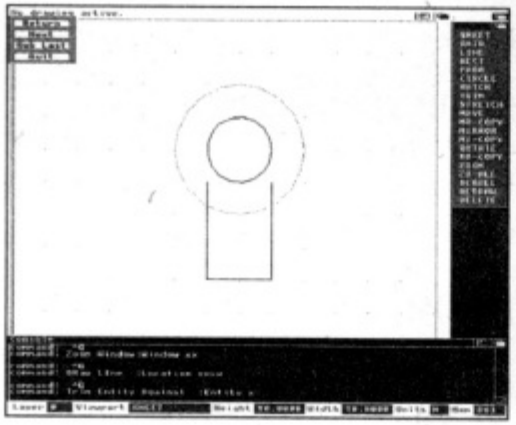
With '**xxx**' in the same position as the diagram at the bottom of the opposite page. Then click on:

[ZOOM] xx

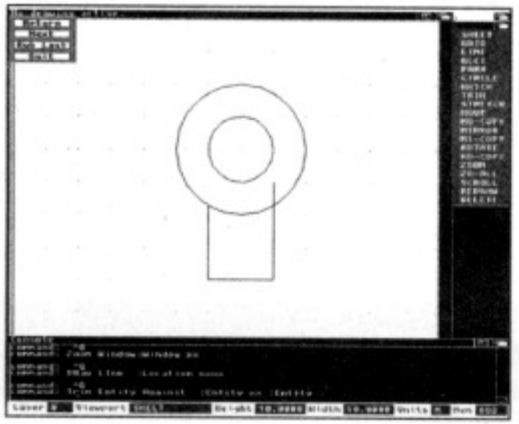
to get a closer view of the circles.



Drawing several lines in one go, not too tidy though.



... so trim the lines to the circle...



... just like this.

Now to draw in some more details, select:

[LINE] [ACTION] xxxx [RETURN]

Where '**xxxx**' indicates the three lines shown in the diagram at the top of the opposite page.
It is immediately noticeable that this looks very rough, so we will trim the lines by selecting:

[TRIM] [AGAINST] [ACTION] x

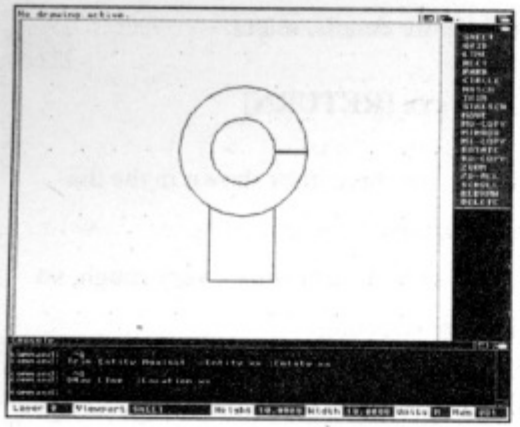
Where '**x**' is the outer circle as in the diagram centre opposite. The reason for selecting the circle first is that you are trimming the line AGAINST the circle. Now select:

x [NEXT]

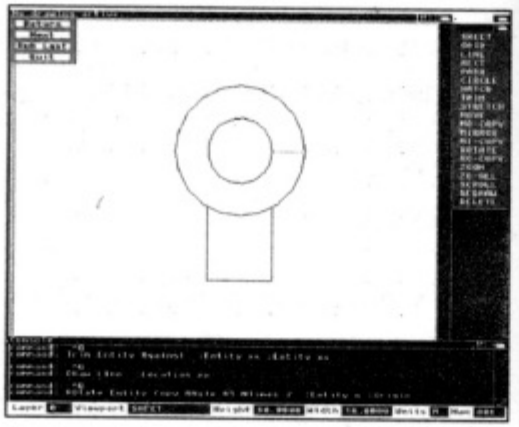
With '**x**' being the piece of line which has gone in the diagram bottom opposite. Then repeat the process for the other loose end by clicking on:

xx [RETURN]

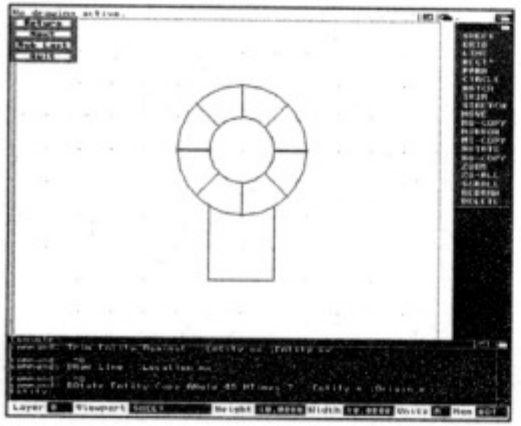
The picture is beginning to look like a tap at last! There's just one more thing to do ...



The horizontal beginnings of a hand grip.



Using ro-copy, select the line with the origin at the centre point of the inner circle ...



... and there you have it. A proper looking grip.

... and that's to give the handle a little life, so select in the same order:

[LINE] [ACTION] xx [RETURN]

As in the diagram at the top of the opposite page. Now to use 'Ro-copy' in a slightly different way from last time. This time select:

[RO-COPY] [ANGLE] [4] [5] [SPACE] [NTIMES] [7] [SPACE] [ACTION] x [NEXT]

Where '**x**' means select the line you have just drawn, then:

x [RETURN]

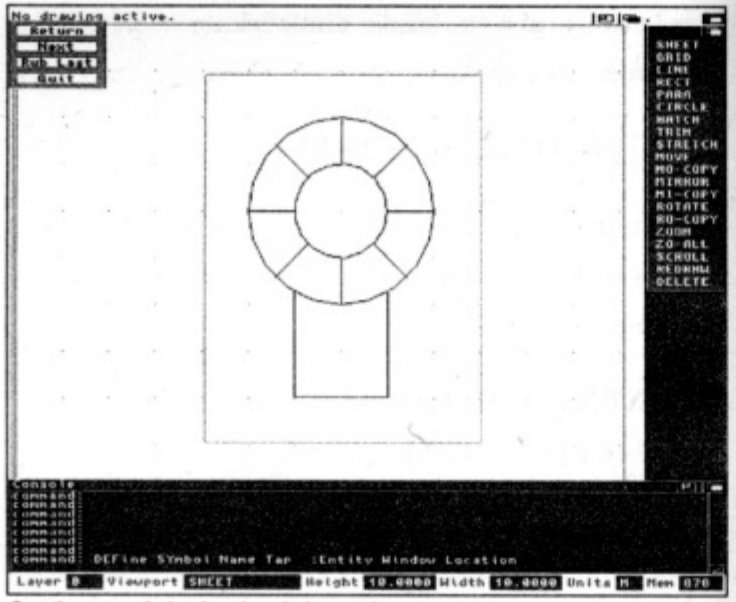
... and this '**x**' is the centre of the circles. This tells XCAD to draw the line 7 more times but using the centre of the circles to spin it around. You should now have a completed tap, like the one at the bottom of the opposite page.

Now to turn the tap into a symbol and learn a neat short-cut on the way ... go to PDM Symbol, select Define Symbol and then name, like so:

PDM: SYMBOL → DEFINE SYMBOL [NAME]

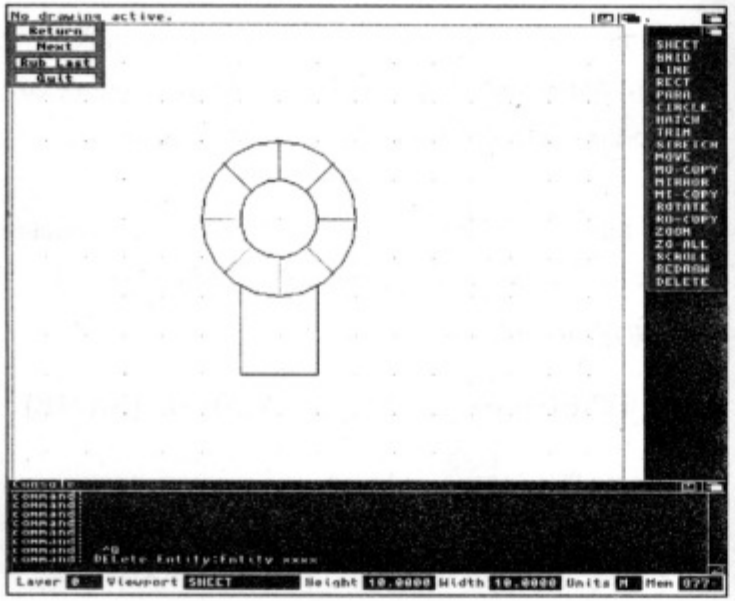
... then type "tap" at the keyboard ...

"tap" [SPACE]



Creating a symbol using the window option.

Deleting just a few lines to begin with.



Now for the sneaky bit – rather than clicking on all the lines which make up the tap, go to PDM Entity, select Window:

PDM: ENTITY → WINDOW

... and make a rectangle around the entire tap as in the picture top opposite, then click on ...

xx [NEXT] x

... and the origin should be the centre of the circles.
The window option only selects lines which are completely inside the rectangle drawn.

To show the differences, try selecting the following:

[DELETE] xxxxxx [NEXT]

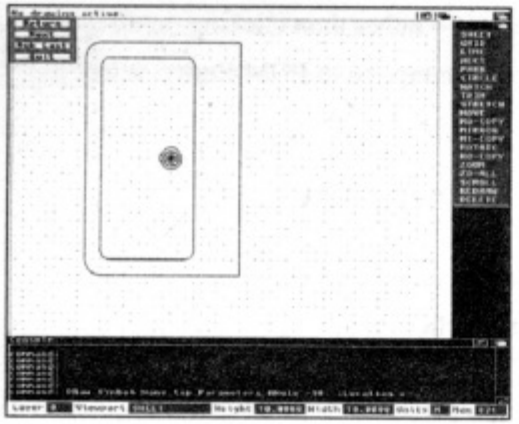
Where '**xxxxx**' are any lines you choose. Then try experimenting with:

PDM: ENTITY → WINDOW xx [NEXT]

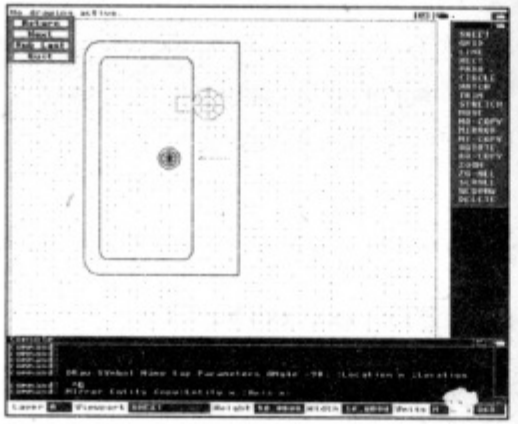
You now need to place the taps on the basin, so select ...

[ZO-ALL] [ZOOM] xx

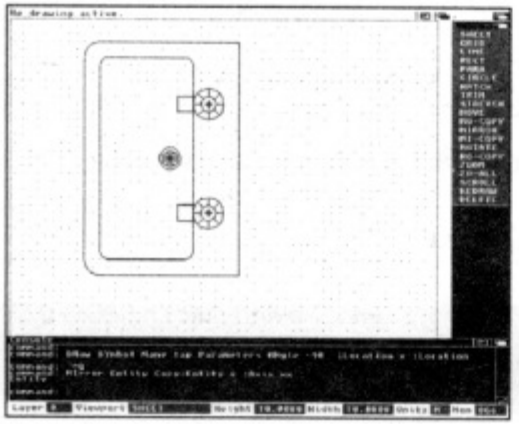
... to get the basin back into sight. Now to place a tap on the basin. It needs to be placed at an angle of -90 degrees



Place the tap right on the little cross ...



... produce a mirror image and ...



... there you have it. One standard basin which could be used in any floorplans you produce. Try using your new skills to produce a plan of your bathroom.

(turned clockwise) so that it is positioned correctly. So go to PDM and select Symbol and Draw Symbol ie:

PDM: SYMBOL → DRAW SYMBOL

then select the following:

[NAME] "tap" [PARAMETERS] [ANGLE] [-] [9] [0] [SPACE] [ACTION] x [RETURN]

Where '**x**' is a suitable position for the centre of the tap, as in the diagram top opposite. Then the other tap, which can be placed using a different technique:

[MI-COPY] x [NEXT]

Where '**x**' is the tap ...

xx [RETURN]

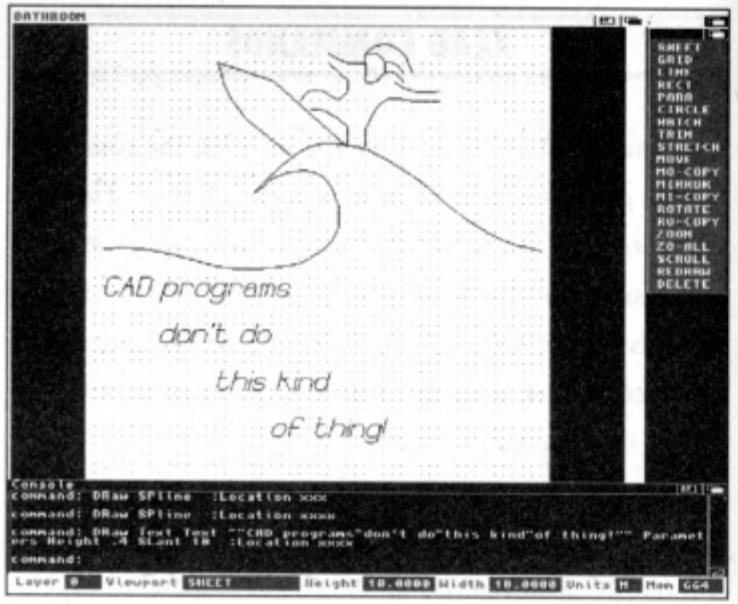
... and '**xx**' is the axis (line about which the tap will be mirrored). Now you have the completed basin. If you still feel a little unsteady with XCAD then try reproducing the basin without the instructions or even the entire bathroom, which should improve your confidence greatly.

XCAD COMMANDS

Now that you have completed the tutorial, the commands presented here should be easy to follow. These will allow you to use XCAD Designer to practice excellent results. For further instructions and a CU AMIGA exclusive upgrade to XCAD 2000 contact Phospore Dot Productions, tel: 0843 292 150. Upgrade price: £19.95.

The system used to describe commands in the following sections is the same as that used in the tutorials. If you want to learn the abbreviations for commands entered into the console, the abbreviations are shown in the index.
Once you have gained sufficient experience of using XCAD, you should find it relatively easy to either make an educated guess about a particular command's function or to experiment with its use.

Where possible you should experiment with the commands repeatedly before using them for real, sometimes they don't work in quite the way you thought or change slightly depending on the order of clicking (like fillet). If you have even the slightest doubt, save your work first!



XCAD is truly flexible. But other programs may be better for this sort of thing!

FILE COMMANDS

These are pretty much standard file options, as found in any Amiga application. If you experience trouble here, read your Workbench manual, it contains far more detail on file handling than could be included in this manual.

CLOSE DRAWING - Save the current drawing and open a new, blank, sheet.

CLOSE MENUSTRIP - Removes the current tool bar/menustrip from the screen.

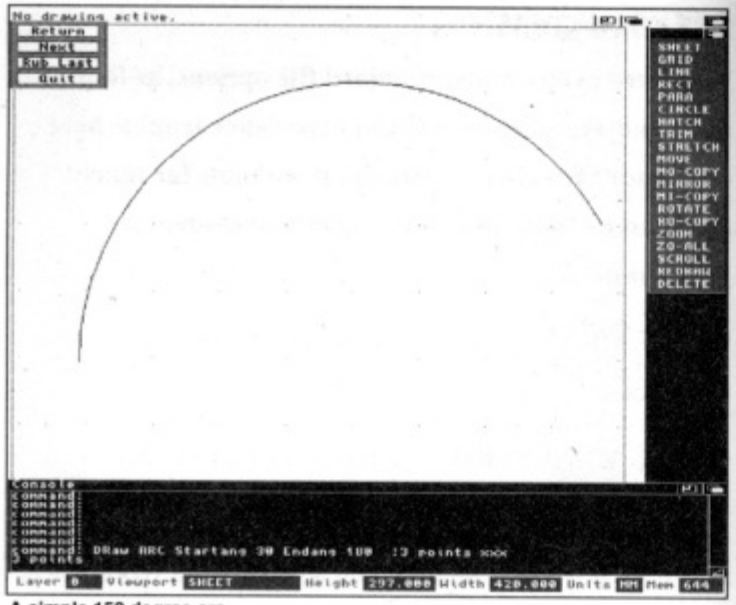
EXIT XCAD - Quit the program and return to Workbench.

OPEN DRAWING - Load a previously saved drawing.

OPEN MENUSTRIP - Load a new tool bar/menu strip.

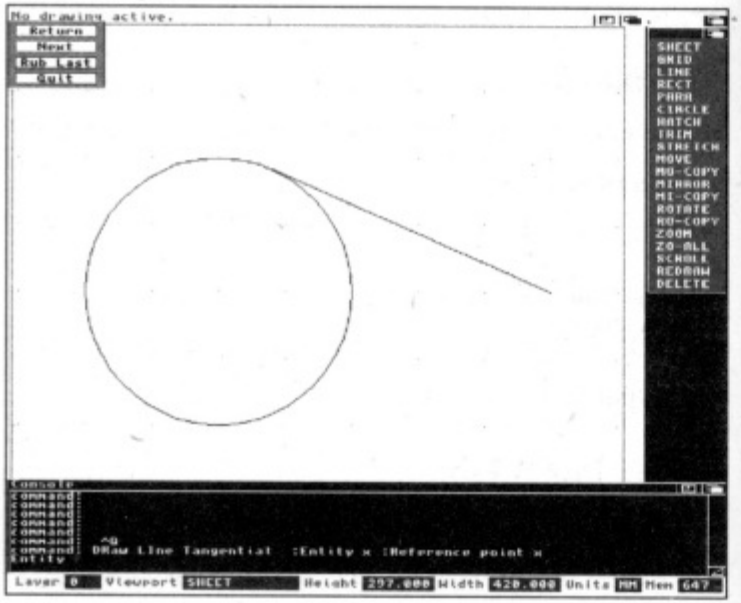
SAVE DRAWING - Simply save the current drawing without closing it. Useful, you should use this option regularly whilst working.

In all the following examples remember that a small 'x' is one click of a left mouse button which selects a point where your cursor was situated.



A simple 150 degree arc.

The line is tangential to the curve.



DRAWING COMMANDS

All of these commands are accessed from the DRAW menu:

DRAW ARC - Part of a circle.

STARTANG - Angle at which the arc starts (remember it's anti-clockwise from the 3 o'clock position).

ENDANG - The angle at which the arc ends.

RADIUS - Radius of the arc.

PARALLEL - Distance in current units (e.g. 24.5 mm) used to calculate radius of the arc in relation to another arc or a circle.

Example:

DRAW ARC

[STARTANG] 30 [ENDANG] 180 [ACTION] x [RETURN]

DRAW LINE

LENGTH - Length of line in current units.

ANGLE - Angle of line in degrees.

PARALLEL - Distance in current units from another entity.

TANGENTIAL - Used to draw a line at a tangent to one or more curves.

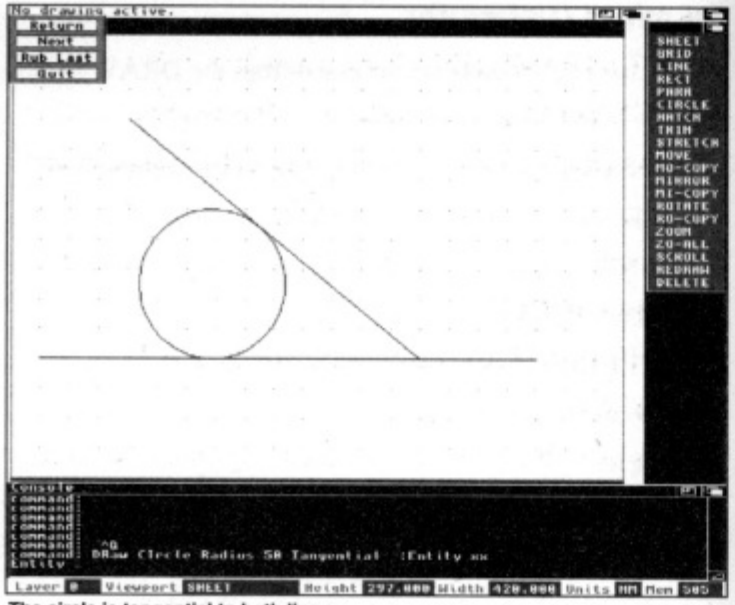
PERPENDICULAR - Draw the line at 90 degrees to an entity.

RECTANGLE - Draws a box.

Example: **DRAW LINE**

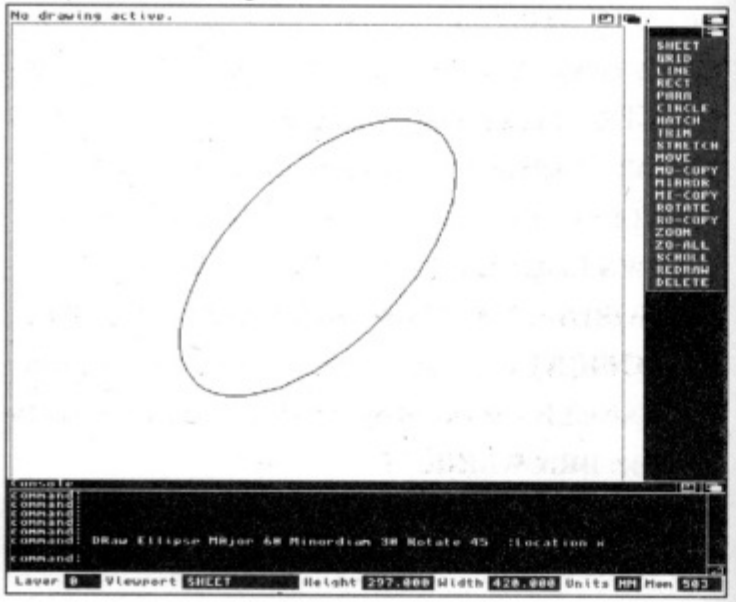
[TANGENTIAL] [ACTION] x [NEXT] x [RETURN]

The first click is to select the object to be tangential to.



The circle is tangential to both lines.

An ellipse rotated at 45 degrees.



DRAW CIRCLE

RADIUS/DIAMETER - In current units.

TANGENTIAL - At a tangent to another entity.

PARALLEL - Distance in current units from another circle or arc.

Example:

DRAW CIRCLE

[RADIUS] 50 [TANGENTIAL] [ACTION] xx [RETURN]

Circles may also be placed by specifying points (see tutorial page 43).

DRAW ELLIPSE - An oval shape.

MAJORDIAM - Diameter of the larger part of the ellipse.

MINORDIAM - Diameter of the smaller part.

STARTANG - Starting angle in degrees.

ENDANG - Ending angle in degrees.

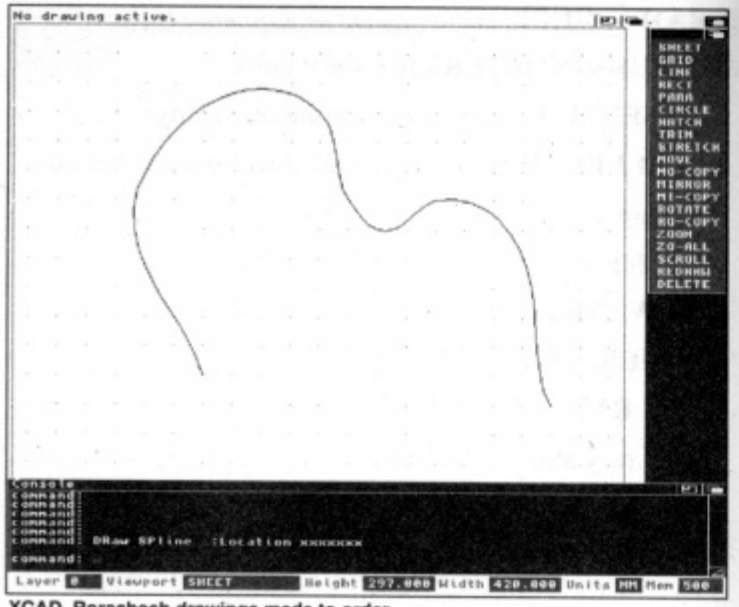
ROTATE - The angle at which the ellipse is placed.

Example:

DRAW ELLIPSE

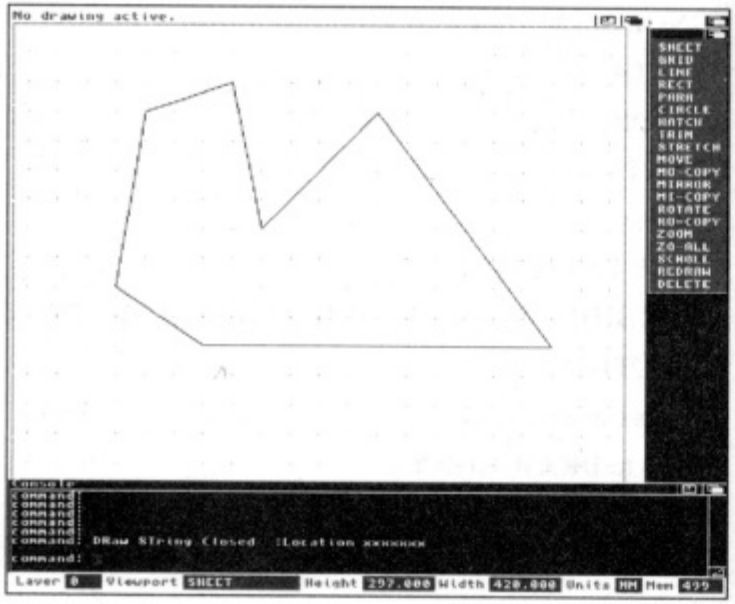
[MAJORDIAM] 60 [MINORDIAM] 30 [ROTATE] 45 [ACTION] x

Ellipses can also be placed by specifying points in a similar fashion to **DRAW CIRCLE**.



XCAD, Rorschach drawings made to order.

Rorschach meets Picasso.



DRAW SPLINE - A smooth curve tool.

CLOSED - Creates a closed loop.

Example:

DRAW SPLINE

[ACTION] xxxxxxx [RETURN]

IMPORTANT: Splines work in a different way to most entities. Experiment for best results.

DRAW STRING - Creates multiple lines as a single entity.

CLOSED - Creates a closed loop.

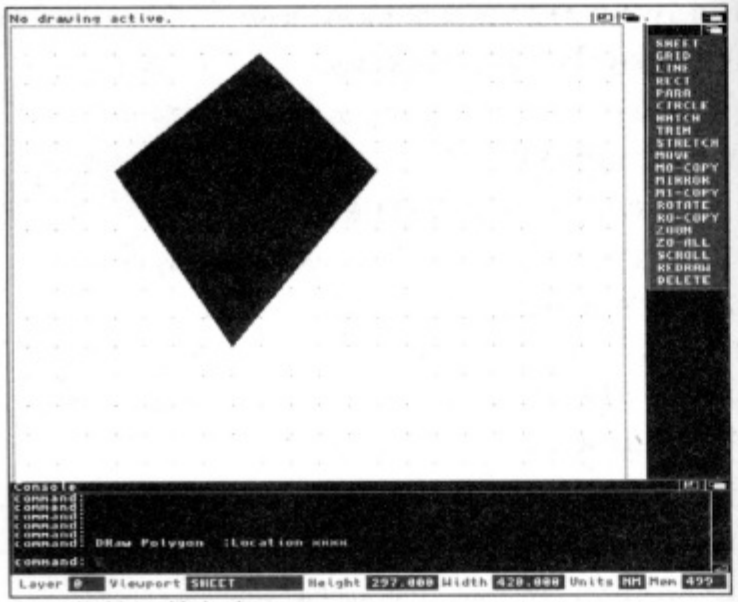
RECTANGLE - Creates a rectangle as a single entity (a normal rectangle is four entities).

PARALLEL - Distance from another entity in current units.

Example:

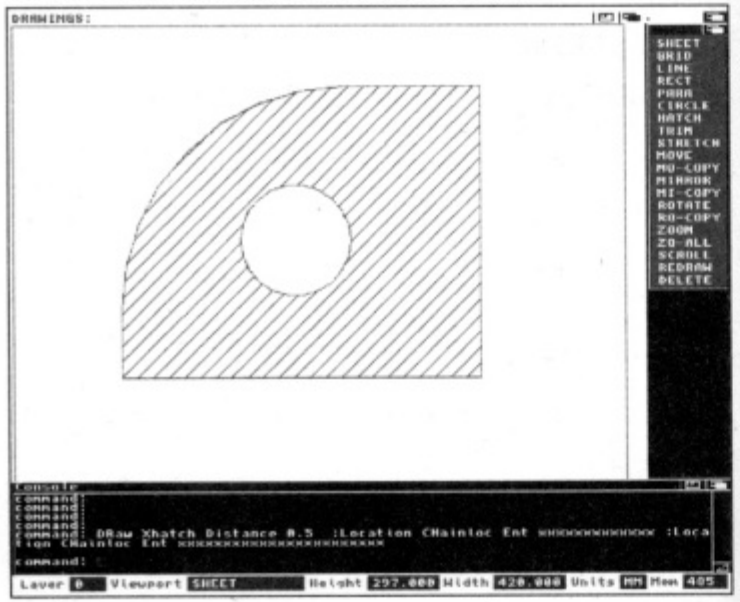
DRAW STRING

[CLOSED] [ACTION] xxxxxxx [RETURN]



A standard four sided polygon.

The cross-hatch command used on a fairly simple object.



DRAW POLYGON - A closed shape which is solid. This is a slightly more complex tool than most. It can be used to create a simple filled shape or, by using **CHAINLOC** in the **LOCATION PDM**, can fill complex objects which have up to 31 'holes' in them.

Example 1**:**

DRAW POLYGON [ACTION] xxxx [RETURN]

This will draw a polygon as shown at the top of the opposite page.

Example 2**:**

DRAW POLYGON [ACTION] LOCATION - CHAINLOC x [NEXT] CHAINLOC x [NEXT] CHAINLOC x [NEXT] [RETURN]

Where the first 'x' is the object outline, the second and third are the inner 'holes' as illustrated in the diagram middle opposite.

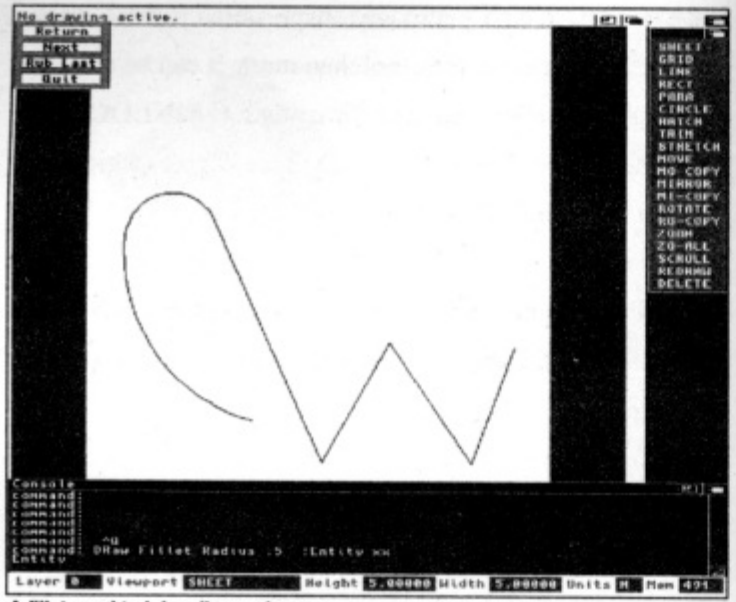
DRAW XHATCH - Creates cross-hatching, works in the same way as **DRAW POLYGON.**

DISTANCE - Gap between lines in current units.

ANGLE - Default is 45 degrees.

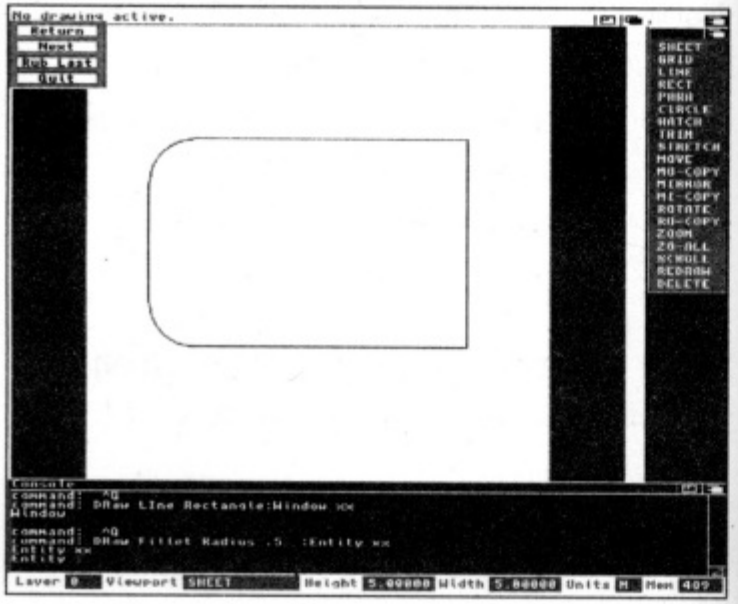
Example**:**

DRAW XHATCH [DISTANCE] 0.5 [ACTION] CHAINLOC x [ACTION] CHAINLOC x [RETURN]



A fillet used to join a line and an arc.

A fillet used in the same way as the tutorial.



DRAW FILLET - Creates smooth corners.

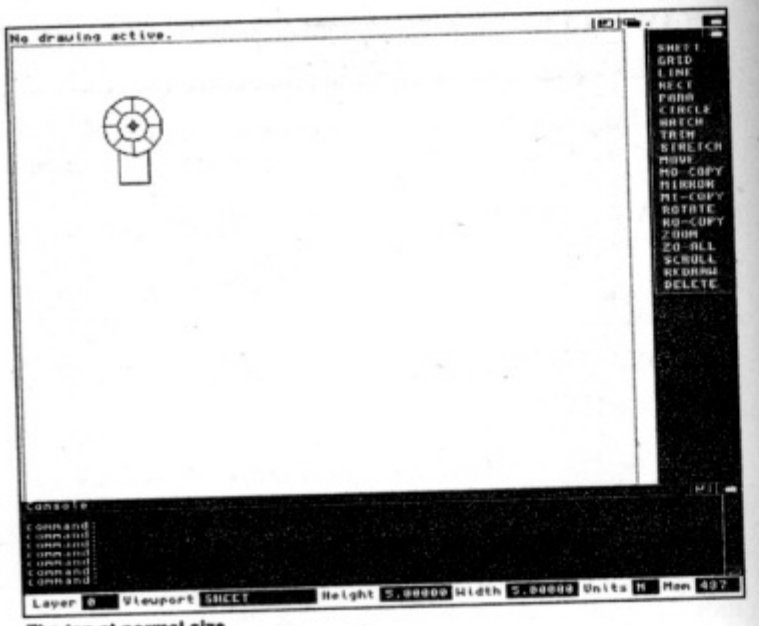
RADIUS - Radius of the curve in current units.

NOTRIM - Leaves the edges rather than trimming them.

Example:

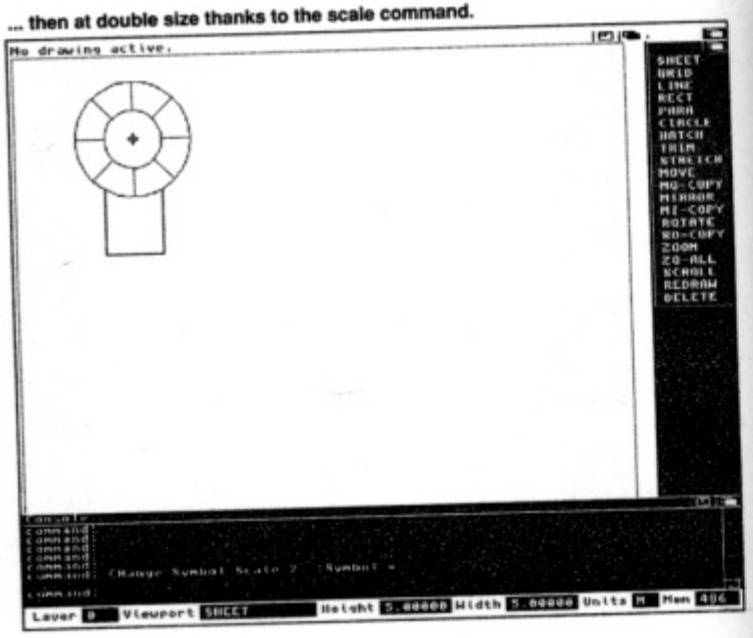
DRAW FILLET [RADIUS] 0.5 [ACTION] xx

There are two other commands available in the draw menu, **ARROW** and **CPOINT**, which behave in the same way as some of the above functions. It should also be noted that several of the commands listed previously have either only partial explanations of their functions or a very limited description of their capabilities. The full manual contains more in-depth instructions on all of the above but you should be well able to get by with these.



The tap at normal size.

... then at double size thanks to the scale command.



SYMBOLS

As shown in the tutorial, symbols are essentially the same as brushes in a paint program. They can be placed anywhere on the sheet at any angle and any scale. They save an enormous amount of time when creating a complex, repetitive drawing. All of these commands are accessed from the **SYMBOL** menu.

CHANGE SYMBOL - Alter a symbol which has already been placed.

ANGLE - Rotate the symbol

MIRRORX - Turn the symbol upside down (mirror about the X axis).

MIRRORY - Turn the symbol left to right (mirror about the Y axis).

SCALE - The size of the symbol (1 is normal size).

Example:

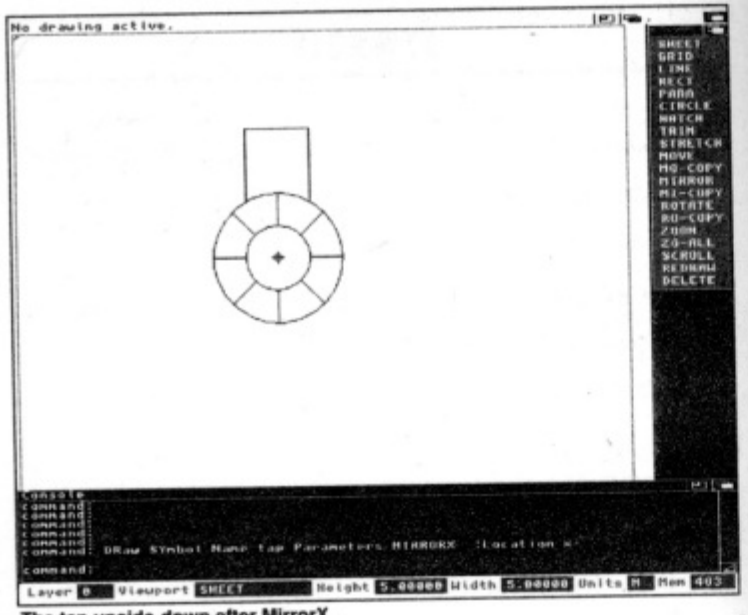
CHANGE SYMBOL [SCALE] 2 [ACTION] x

Doubles the size of a symbol.

DEFINE SYMBOL - 'Picks up' a symbol; refer to tutorial on page 47.

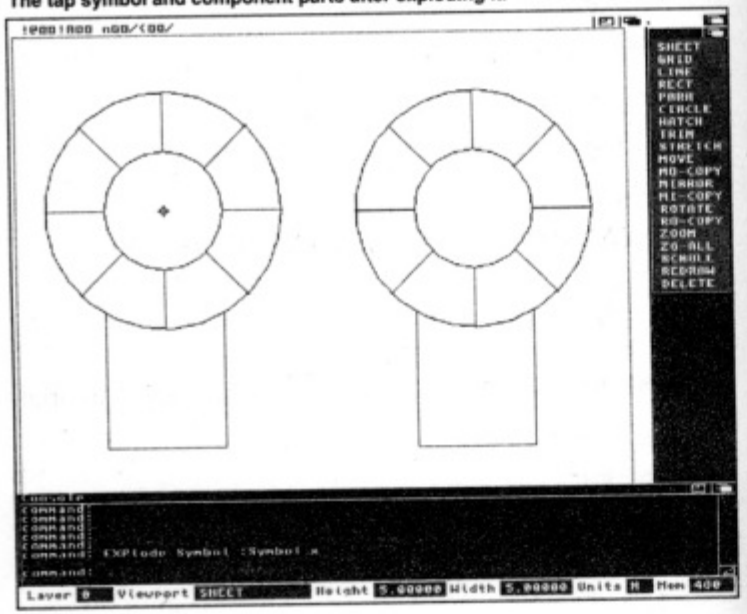
NAME - Filename of the symbol

DRAW SYMBOL - Places a copy of a symbol on the sheet.



The tap upside-down after MirrorX.

The tap symbol and component parts after exploding it.



NAME - The symbol to be used.

ANGLE - Angle at which symbol is placed.

MIRRORX - Upside down (mirrored about the X axis).

MIRRORY - Left to right (mirrored about the Y axis).

SCALE - Size of symbol (1 is normal size).

Example:

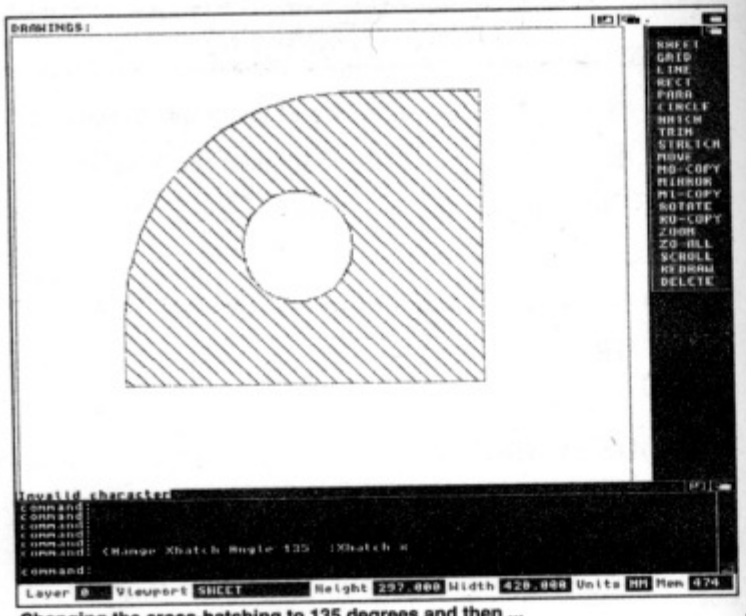
DRAW SYMBOL NAME "tap" [PARAMETERS] [MIRRORX]

EXPLODE SYMBOL - Reduce symbol to component parts.

The symbol returns to being the lines which make it up. Useful if you wish to modify an existing symbol. The drawing can be turned back into a symbol by using **DEFINE SYMBOL** again.

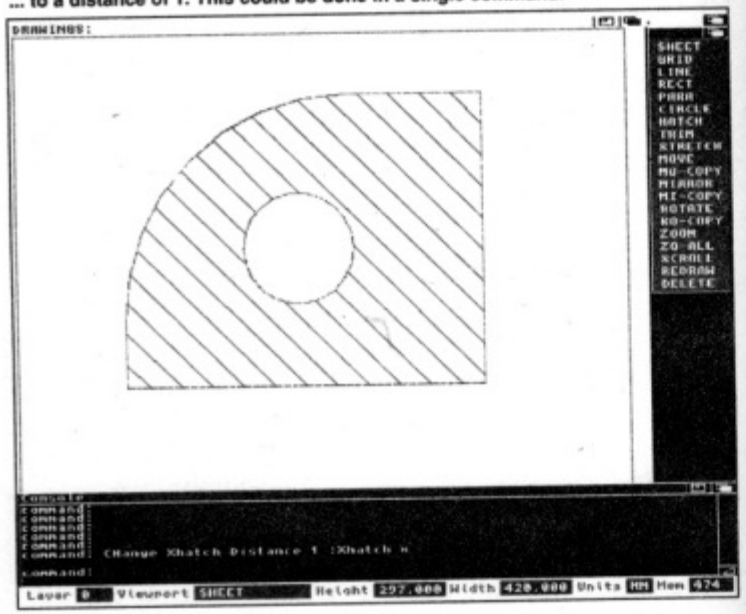
UPDATE SYMBOL - Replaces the selected symbol with a newer version.

The replacement symbol must have the same filename. Useful if you have modified a symbol.



Changing the cross-hatching to 135 degrees and then ...

... to a distance of 1. This could be done in a single command.



EDITING COMMANDS

All of the following commands are accessed from the **EDIT** menu. They are used to modify an existing entity. This is one of the most useful parts of XCAD.

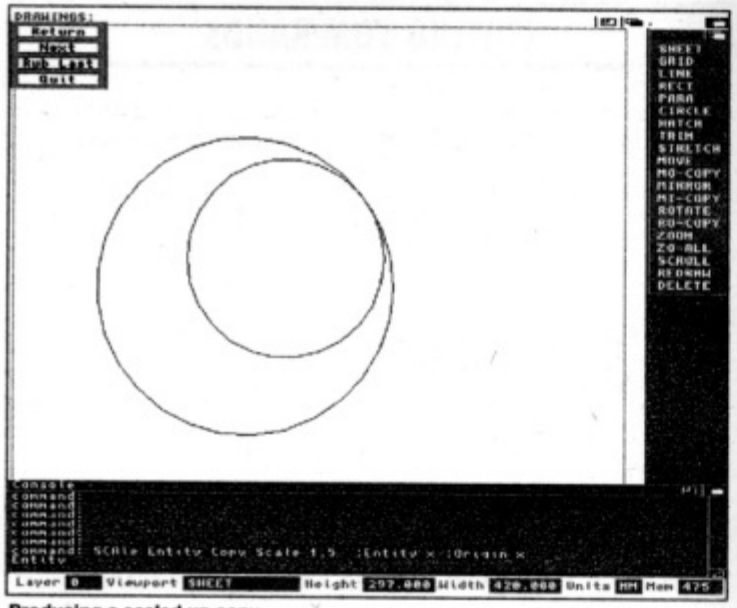
CHANGE XHATCH - Modify an existing crosshatch.
DISTANCE - Separation of lines in current units.
ANGLE - Angle of lines in degrees.

Example:
CHANGE XHATCH [ANGLE] 135 [ACTION] x

DELETE ENTITY - A self explanatory and often used command.
See page 47 for a short example of its use.

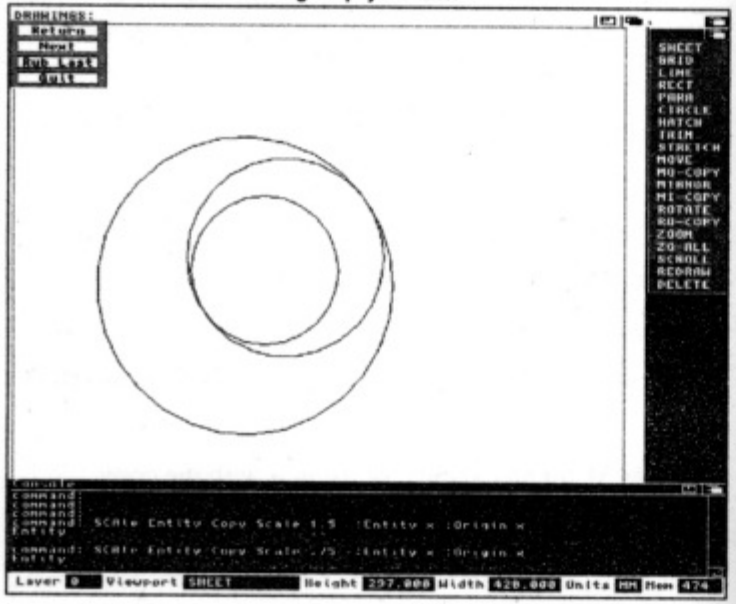
MIRROR ENTITY - Produces a mirror image of the selected entities.
COPY - Produces a copy of the original rather than moving it.

See page 51 for an example of using it with the copy option.



Producing a scaled up copy ...

... and a scaled down one. CAD goes psychedelic.



MOVE ENTITY - Moves the selected entities from one place to another.

COPY - Produces a copy of the original rather than moving it.

See page 31 for an example of a move without the copy option.

ROTATE ENTITY - Rotate the selected entities.

COPY - Produces a copy of the original rather than rotating it.

ANGLE - Angle of rotation in degrees.

NTIMES - Number of times rotation should be performed.

The example on page 45 gives a good idea of what can be achieved.

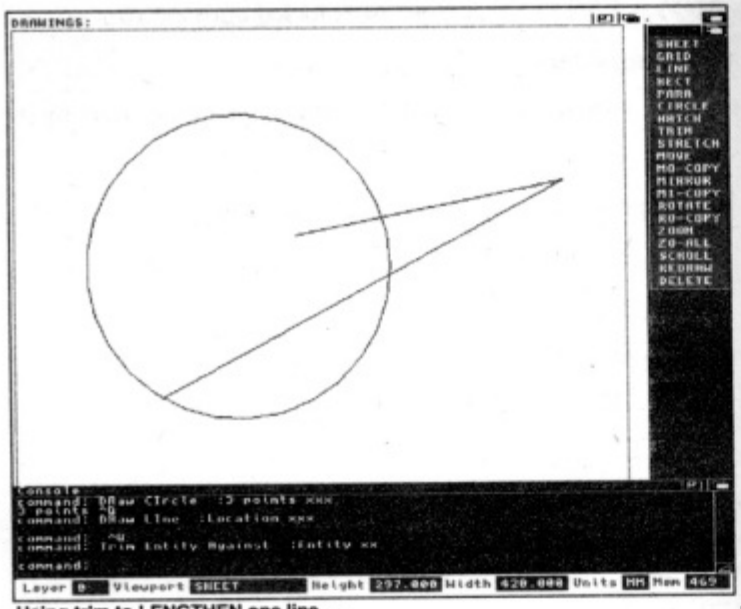
SCALE ENTITY - Change the size of the selected entities.

COPY - Produces a copy of the original rather than scaling it.

SCALE - The scale factor (1 is full size).

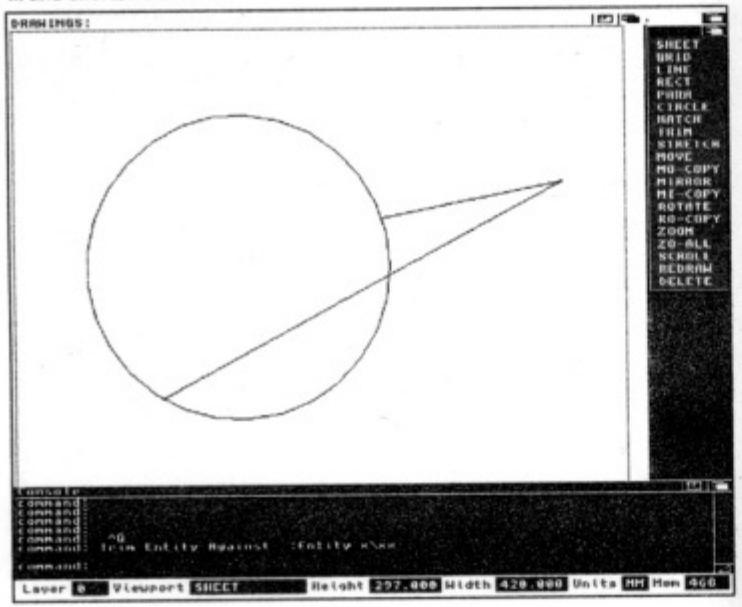
Example:

SCALE ENTITY [COPY] [SCALE] 1.5 [ACTION] x [SPACE] x



Using trim to LENGTHEN one line ...

... and shorten the other.

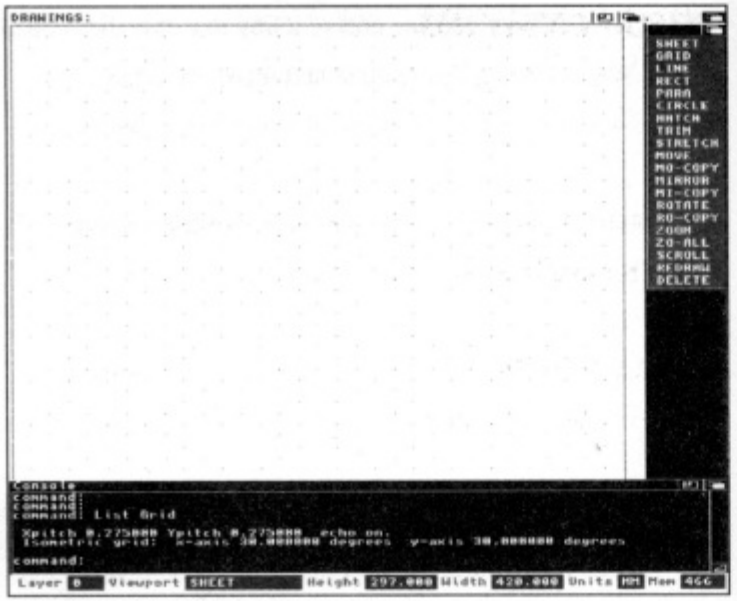


TRIM ENTITY - Crop the end of a line to a specific point.

AGAINST - Crop a line against an entity.

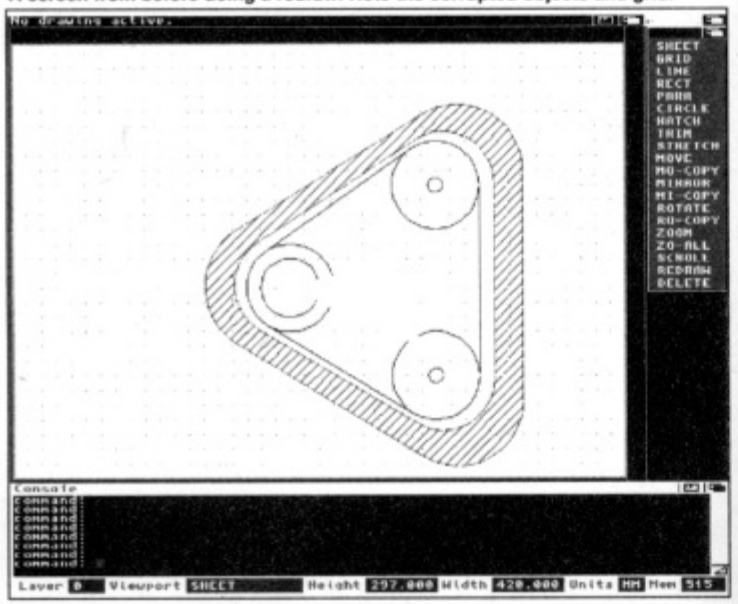
See page 45 for a good example of using trim against.

Once again, there are more commands available if you examine the menus but these will start you out on the right footing.



A blank page with an isometric grid, as listed.

A screen from before doing a redraw. Note the corrupted objects and grid.



DISPLAY COMMANDS

All of these commands are accessed from the **DISPLAY** menu.

LIST GRID - Describes the parameters of the current grid in the console window.

REDRAW DISPLAY - Refreshes the screen, useful if some entities are corrupted.

SCROLL WINDOW - Moves the visible area.

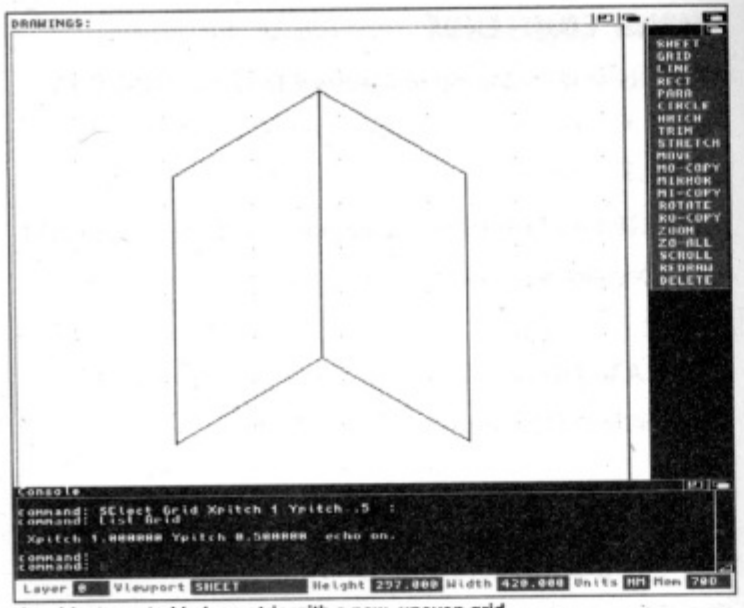
UP - Scroll up by half a screen.

DOWN - Scroll down by half a screen.

LEFT - Scroll left by half a screen.

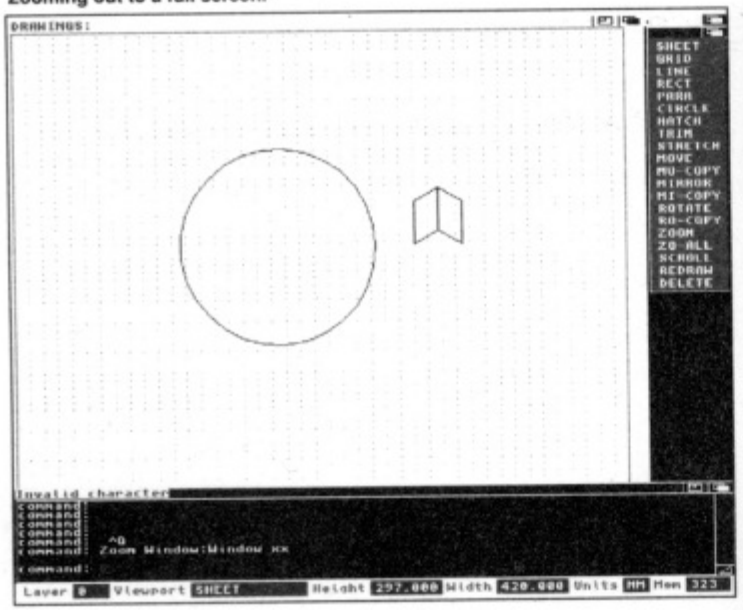
RIGHT - Scroll right by half a screen.

This command is extraordinarily useful when working at close range.



An object created in isometric with a new, uneven grid.

Zooming out to a full screen.



SELECT GRID - Create a grid of a certain size.

SIZE - The grid spacing in current units.

XPITCH - The horizontal grid spacing in current units.

YPITCH - The vertical grid spacing in current units.

ISO - Create an isometric grid...

XAXIS - The angle in degrees of the X axis.

YAXIS - The angle in degrees of the Y axis.

Example:

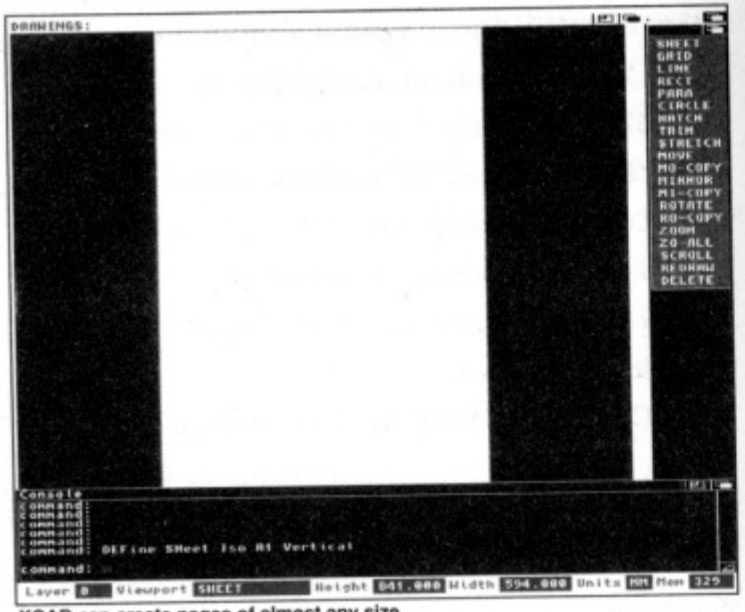
SELECT GRID [XPITCH] 1 [YPITCH] 0.5

ZOOM ALL - Show the entire sheet.

ZOOM DOWN - Double the magnification.

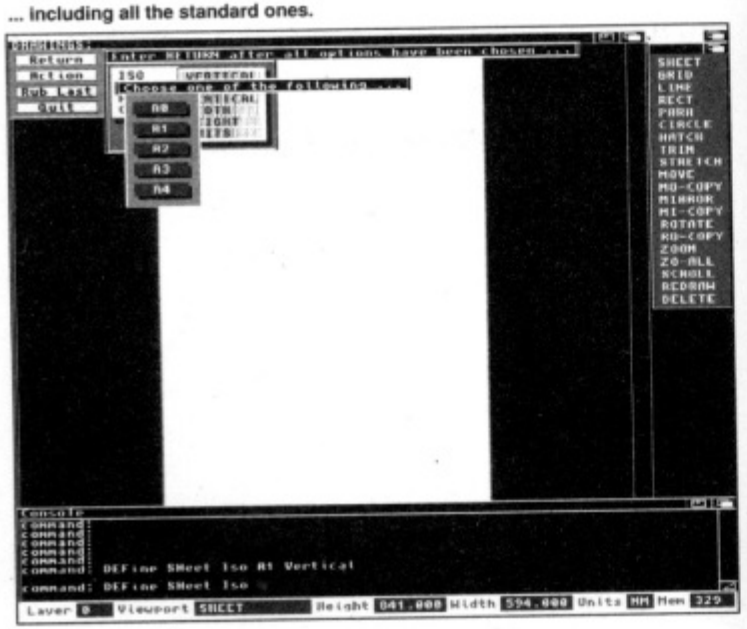
ZOOM UP - Halve the magnification.

ZOOM WINDOW - Zoom in on a specific area.



XCAD can create pages of almost any size...

... including all the standard ones.



VIEW COMMANDS

All of these commands are accessed from the **VIEW** menu.

DEFINE SHEET - Create a new sheet.

ISO - Choose an ISO size: A0, A1, A2, A3 or A4.

BS - Choose a BS size: B1, B2, B3 or B4.

ANSI - Choose an **ANSI** size: A, B, C, D or E.

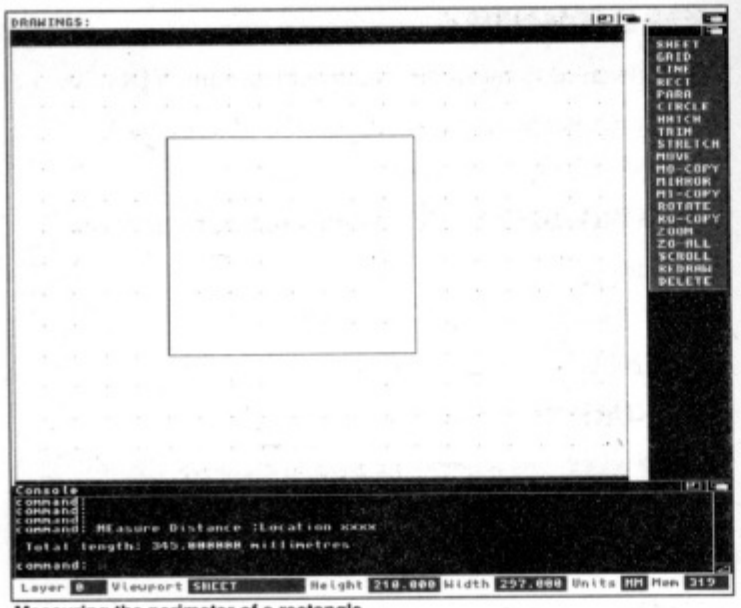
VERTICAL - Vertically orientate the sheet.

CUSTOM - Create your own size.

UNITS - Lets you choose the measuring units e.g. miles.

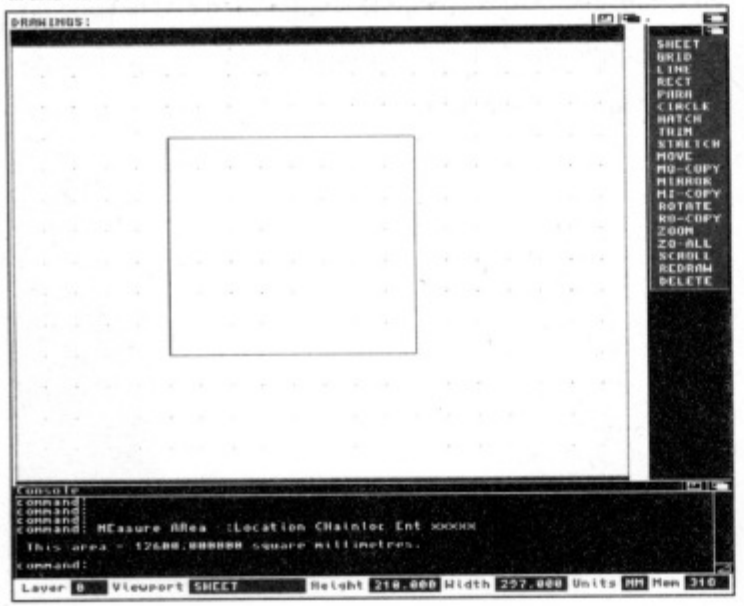
DEFINE SHEET [ISO] [A1] [VERTICAL]

There are many **VIEWPORT** commands in this menu, unfortunately their use is quite complicated and beyond the scope of this guide. Try experimenting after saving or consult the upgrade manual.



Measuring the perimeter of a rectangle ...

... and its area.



VERIFY COMMANDS

Verify is used to measure lengths, areas and angles. Its commands are accessed from the **VERIFY** menu.

MEASURE DISTANCE - Show the length between points.

Example:

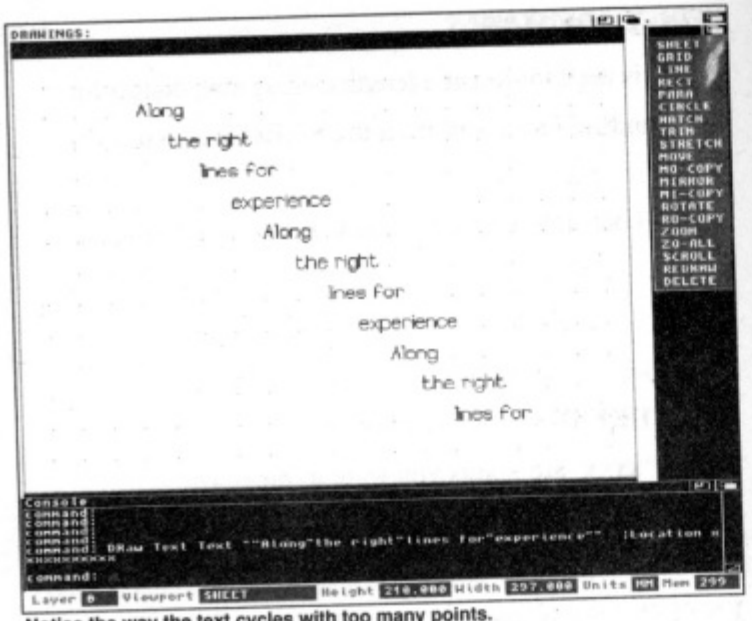
MEASURE DISTANCE xxxx

Where '**xxxx**' are points you want to measure.

MEASURE AREA - Show the area of the selected entities.

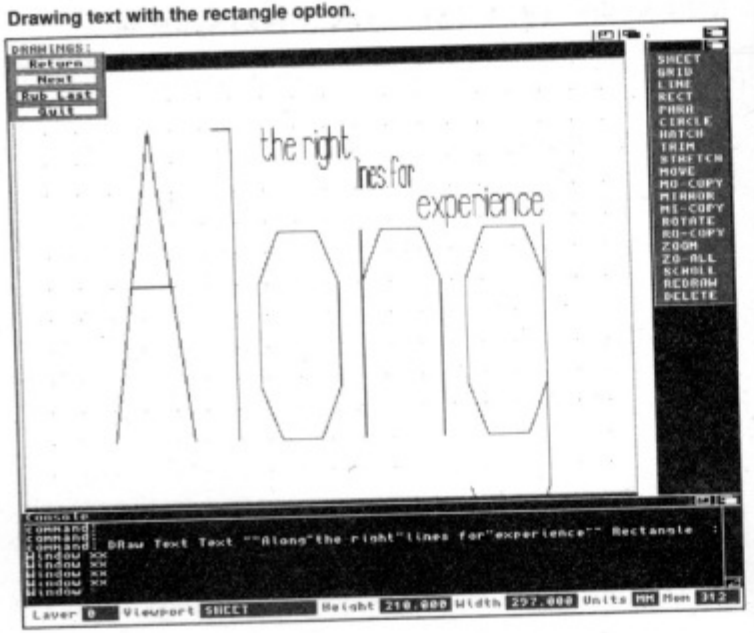
ENTITY - Show the area selected with '**xxxx**'

MEASURE AREA [ACTION] CHAINLOC x



Notice the way the text cycles with too many points.

Drawing text with the rectangle option.



TEXT COMMANDS

This section should get you started putting text into your design. These commands are accessed from the TEXT menu.

DRAW TEXT - Place text on the sheet.

RECTANGLE - Place the text in a rectangle.

TEXT - Must be entered before typing your text.

PARAMETERS:

HEIGHT - In current units.

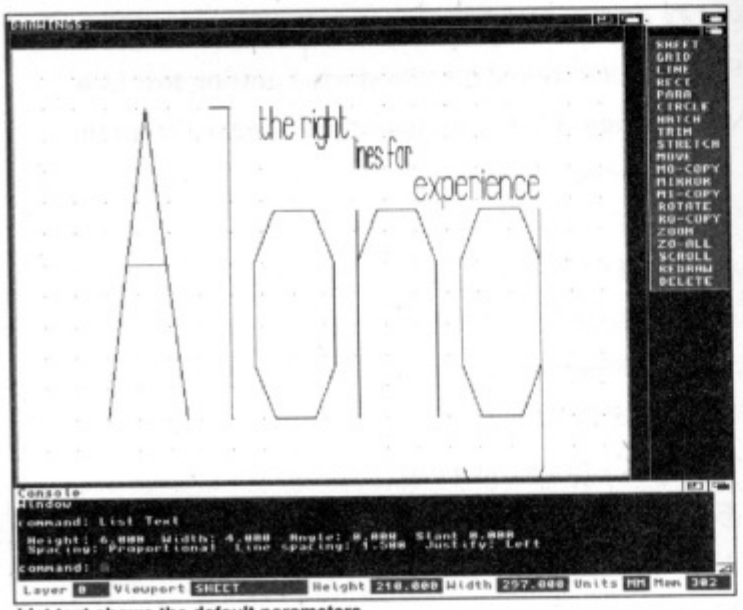
WIDTH - In current units.

ANGLE - Rotate the text to specified degree.

SLANT - Italicise the text by specified degrees.

DRAW TEXT [TEXT] ""Along"the right"lines for"experience"" [ACTION] xxxxxxxxx

IMPORTANT: Text should be entered in two sets of quotes exactly as shown above. The single quotes at various intervals tell XCAD to place the text on multiple lines, as shown in the diagram top opposite. Clicking more points than there are text lines will make XCAD repeat the text lines as in the diagram bottom opposite.



List text shows the default parameters.

A standard label. Try using more points.

SELECT TEXT - Creates the default text format.

ENTITY - Use selected text's attributes as default text format.

PARAMETERS - As for **DRAW TEXT.**

LIST TEXT - List the current text format in the console window.

DRAW LABEL - Creates a text line with an arrow pointer.

ARROWHEAD - Choose between filled, closed and open.

LENGTH - Of arrowhead in current units.

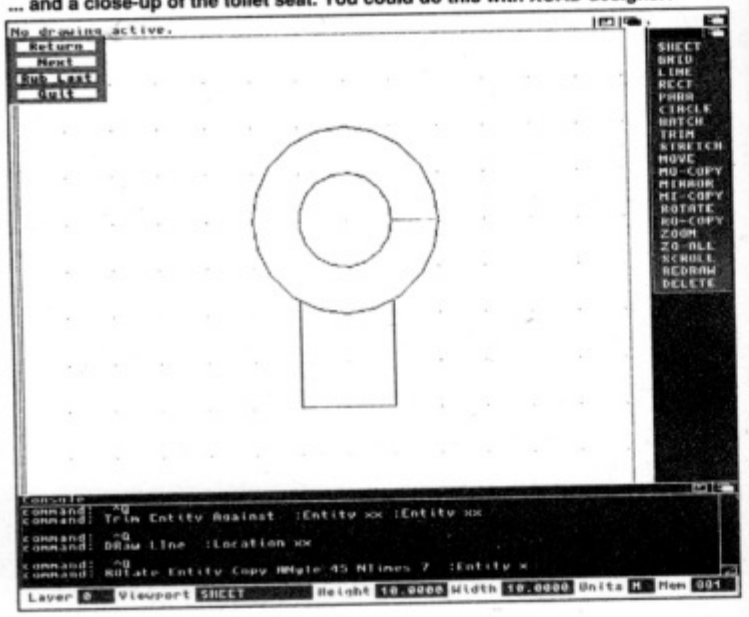
TEXT - As for **DRAW TEXT.**

DRAW LABEL [TEXT] “”Basin”” [ARROW-HEAD] [OPEN] [LENGTH] 0.2 [ACTION] xx

IMPORTANT: The first 'x' is where the point of the arrow will appear.

A drawing loaded from XCAD's big brother ...

... and a close-up of the toilet seat. You could do this with XCAD designer!



PLOT COMMANDS

These commands are used to create output from XCAD. They are all accessed from the PLOT menu.

PLOT EPSON - Print the current drawing to an Epson compatible printer.
DENSITY - low for 9 pin printers (default), high for 24 pin.
SCALE - Size of output in relation to sheet size (1 is full size)
ROTATE - Turns the print through 90 degrees.

IMPORTANT: You must specify a scale if the sheet size is larger than the paper in your printer.

PLOT IFF - Produces a 'screen grab' of the current screen.
TO - Specify the filename.

PLOT PREFERENCES - Prints a screen dump to any printer selected in preferences.
SOURCE - select between screen for complete dump or drawing for just the picture.

GLOSSARY

ANGLE - Rotation in degrees from the positive X axis (three o'clock position).

AUTOCAD - A very expensive PC CAD system generally considered the industry standard.

AXIS - Imaginary line, usually horizontal or vertical, from which drawing co-ordinates are calculated.

BACK SPACE - The key on the keyboard used to erase the last character.

CAD - Computer Aided Design.

CAM - Computer Aided Manufacture. Well beyond XCAD's capabilities, this is the use of computer automation, robots etc. in the manufacturing process.

CLOSED - A series of lines which form a loop.

CONSOLE - The window at the bottom of XCAD's screen, used to enter commands at the keyboard. Also shows commands initiated with the mouse.

CO-ORDINATES - Distance from the X and Y axis in the current units.

CPOINT - Construction point. The small red crosses which appear when drawing an entity.

CURRENT UNITS - Measuring system used i.e. millimetres, inches, miles etc.

DIMENSION - XCAD's method of drawing dimensions on the sheet.

DXF - The AutoCAD file format, the industry standard for CAD.

ELLIPSE - An oval shape, like a squashed circle.

ENTITY - Anything which appears on the drawing e.g. lines, circles, symbols, text etc.

EQUIDISTANT - The same distance apart.

EXPLODE - Reduce a complex entity or symbol, made of many parts, into its components e.g. The tap symbol would become its 13 parts instead of a single entity.

FILLET - Make a square corner rounded.

GRID - Equally spaced dots which are used to accurately place entities.

HPGL - Hewlett Packard Graphics Language, the industry standard way of outputting drawings to a plotter.

IFF - The Amiga's standard graphics file format.

JUSTIFY - Align text to the left, right or centre of a point.

LABEL - A written label with an arrow pointing to an entity.

MIRROR - Produce a mirror image of the selected entities.

PARALLEL - Lines which are equidistant along their entire length, the equals sign '=' is a good example of this. One line can be longer than the other as in the two vertical lines in 'h' which are parallel.

PERPENDICULAR - At right-angles to an entity. The down-stroke of 'T' is perpendicular to the crossbar at the top.

PLOT - Output the drawing to a printer or plotter.

PLOTTER - A large device which uses pens to create drawings. XCAD can tell one how to move its pens using the HPGL protocol.

POLYGON - A closed shape which if filled in black.

REDRAW - Recalculate and redisplay all entities shown on the screen.

ROTATE - Spin an object about a specified point.

SHEET - The 'paper' on which you draw. XCAD can simulate a sheet of almost any size.

SPLINE - A smooth curve which passes through several specified points.

STRING - A series of lines which XCAD considers to be a single entity.

TANGENT - A line which smoothly joins a curve. The two vertical lines in 'U' are tangential to its curve.

TRIM - Remove the end of a line connected to another point.

UPDATE - Replace an old symbol with a newer version.

X AXIS - An imaginary horizontal line running across the page from which co-ordinates are measured.

Y AXIS - An imaginary vertical line running up the page from which co-ordinates are measured.

ZOOM - Increase or decrease the magnification used.

TRICKS AND TIPS

Use the **SCALE ENTITY [COPY]** command to produce concentric circles and tunnel effects.

There is a program on Fish disk 373 called PLT: which allows you to output drawings to any preferences printer at its highest resolution, use it to improve your print-outs if you don't have a plotter. This disk can be obtained from most good PD libraries.

Try to learn the keyboard short-cuts for XCAD, it can save you hours of time.

Create symbols for frequently used objects, they will save you hours. Always experiment with unfamiliar commands before attempting to use them on your working diagrams.

Save your work frequently, often XCAD can absorb so much of your attention that you create a different drawing from the one you started.

Use circles as templates for creating cams with the SPLINE command. A good example of a cam shape is the toilet seat in the bathroom shown on page 88.

WHERE TO NEXT?

Our coverdisk XCAD Designer will provide everything you need to get up and running in the exciting world of computer aided design. The program will also be valuable to those who wish to go further, and use it at a semi-professional level.

There are however several alternatives, both simpler and more powerful which may also help you.

2D OR NOT 2D

Should you find XCAD Design too difficult (even with this great guide book?) there are several very easy to use drawing programs that will let you create similar results (although with probably more effort). Drawing programs let you 'draw' lines, squares and circles etc on screen so you can create similar illustrations to those in a CAD program. CAD packages do the same but work to exact dimensions, and have many additional tools for manipulating the components of the illustration (the lines and circles etc) and distorting them in ways that traditional architects and designers will find familiar. An example would be that in a drawing program you'd draw a diagonal line and move the start and end points to achieve a desired angle, in a CAD package however you'd draw a line and then type in the desired angle as degrees.

Amiga drawing programs are aimed at Amiga users who wish to create pictures, whereas CAD programs on the Amiga are for CAD users who happen to use an Amiga. The result is that drawing programs tend to make better use of the Amigas intuitive and easy-to-use user interface, and are generally easier to understand and use than CAD programs.

The first of these is the public domain package **SkyPaint.** Being public domain (it shouldn't cost you more than £5) it's very cheap but it doesn't have anywhere near the power or flexibility of XCAD, however it will allow you to create simple illustrations.

Next up are the big commercial drawing programs. This includes programs like **ProDraw** from GoldDisk and **Art Expression** from SoftLogik. Both of these are very powerful and sophisticated, and also have a great many ancillary features (automatic picture tracing, Pantone colours etc) and will let you create pictures that simply wouldn't be possible with XCAD.

Sadly neither of these programs are currently available in the shops, although if you hunt around you may find the odd copy in an advertisement or on smaller dealers' shelves.

UP, UP AND AWAY

If you've used XCAD and decided that it's perfect, but you could use a few more features you could do a lot worse than upgrade to **XCAD 2000**. This is the big brother of our cover disk version, and provides the ability to create drawings in three dimensions, allowing you to add depth to your plans.

XCAD 2000 can be ordered directly from Digital Multimedia (tel: 081 893 4000) and if you've got our XCAD cover disk you'll be eligible for a special discount. The great advantage of this program is that it works in exactly the same way as XCAD Designer so everything you've already learnt won't be wasted!

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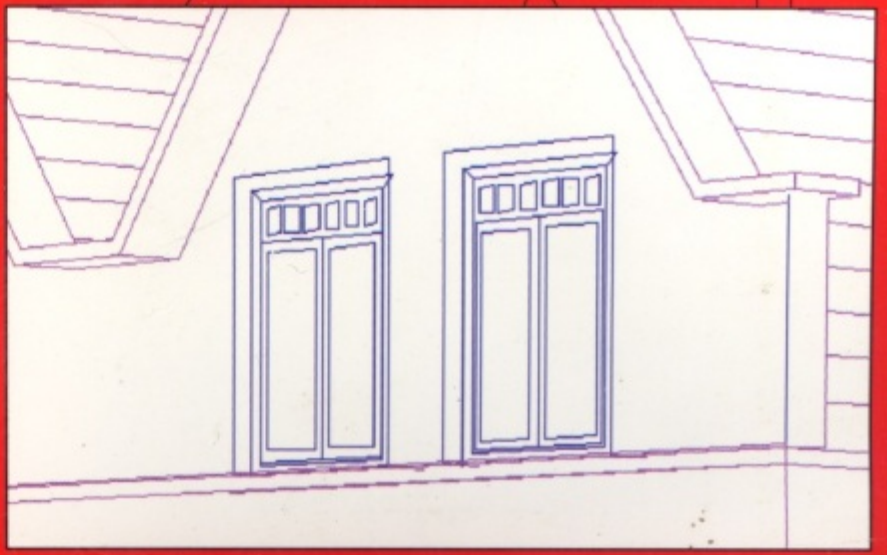
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